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### SOME OBSERVATIONS ON ANTI-O AGGLUTININS.<sup>1</sup>

By RACHEL JAKOBOWICZ AND LUCY M. BRYCE.

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SINCE the discovery of the Rh factor and its important applications in clinical medicine, anthropology and genetics, there has been a tendency to neglect and under-rate the complexity of other blood group systems. Among the antibodies which have received relatively little consideration is the anti-O agglutinin. Its origin and significance are still very much debated, and before we report on our own observations it may be of interest to summarize briefly some theories concerning its place in the range of human blood groups.

The symbol O was originally chosen to indicate a state of negativity—that is, the lack of A and B antigen in the cells belonging to this group; but in 1927 Schiff discovered that certain cattle sera, after being absorbed with AB cells, acted on human red cells of group O, thus giving the latter a positive characteristic—namely, their agglutinability by this antibody. An identical agglutinin was later found to occur naturally in some rabbit, rat and guinea-pig sera and occasionally in human blood; it has also been produced in goats immunized with dysentery bacillus of Shiga. It acts with A<sub>2</sub> cells almost as well as with O cells, but only weakly and irregularly with A<sub>1</sub> cells.

Some workers assume that the action of this antibody is group-specific, and that it is a reaction with the antigen

corresponding to the O gene, either in its overt form in group O or in its recessive state in AO and BO. Dahr (1938), after extensive experiments with absorptions and titrations, thinks that with the aid of potent anti-O sera it is possible to differentiate between homozygous and heterozygous A and B. The strong action on A<sub>2</sub> cells is thought to be due to the fact that blood belonging to this group is almost invariably A<sub>2</sub>O because of the scarcity of the A<sub>1</sub> gene.

Hirszfeld, on the other hand, claims that the action of the anti-O serum is not group-specific. In his earlier papers (1934) he suggests that it reacts with species-specific receptors, which, according to him, are on the surface of the red cells together with the group-receptors A and B. In later publications (Hirszfeld and Amzel, 1940) he seems to modify his views slightly, stating that the receptor O "can be found within A and B cells, independently of their homo- or heterozygosity, i.e., independently of the gene O, which is allelomorphic for the genes A and B. The receptor O should, therefore, be considered as an integral part of the groups A and B; it is as it were ubiquitous and perhaps in this sense characterizes the species". Basing his theory on Bernstein's assumption that the receptors O, A and B are all mutations of one gene, he suggests that this mutation is not quite complete and that—O being taken as a starting point—the development is still progressing, the degree of replacement of O substance being an indicator of the degree of mutation. The human blood can, therefore, be classified in two different ways: (i) according to the direction of mutation (O-A<sub>1</sub>-B-A<sub>2</sub>) into the blood groups; (ii) according to the degree of mutation, the non-mutated O substance being used as indicator—that is, into what he refers to as pleiades (Hirszfeld and Amzel, 1940). In each blood group there are a few cases in which the development is completed, no O substance being present, and such blood can contain anti-O agglutinin (Hirszfeld,

<sup>1</sup> A preliminary report of this work was read at a scientific conference of the Australian Red Cross Blood Transfusion Service, held at Brisbane on June 8, 1948.

1947). According to Hirsfeld, anti-O sera have no group-specific action—that is, they do not affect O, the allelomorph to A and B, but react with this perhaps species-specific non-mutated O substance, by which the blood groups may be classified into pleiades.

The third school of thought is represented by Moureau (1946). He agrees with Hirsfeld that the anti-O agglutinin does not detect the O blood group factor, but does not support Hirsfeld in his assumption of an almost species-specific substance O. Moureau claims that the antigen O of the human red cells is a non-specific antigen, common to man, animals and certain bacteria, and thus in some ways comparable with the widely distributed Forssman antigen.

In a recent publication, Dahr (1947) has tried to combine his and Hirsfeld's theories by postulating that in animal sera at least, the anti-O agglutinin is a mixture of blood group-specific and species-specific antibodies. He quotes absorption tests as evidence. By the use of AB cells as absorbent, it was possible to remove part of the anti-O from cattle sera. Since these cells could not genetically contain blood group factor O, this fraction must be Hirsfeld's species-specific anti-O; but, after no further absorption with A<sub>2</sub>B cells was possible, O cells would still remove a second fraction, which it would seem must be the group-specific part of the anti-O agglutinin.

TABLE I.  
Titration of Serum F with Different Cell Samples.

Blood Group of Cells Used.	Serum Dilutions.					
	1/2	1/4	1/8	1/16	1/32	1/64
A <sub>1</sub> .. ..	++	+				
A <sub>1</sub> .. ..	+					
A <sub>1</sub> .. ..	++	++				
A <sub>2</sub> .. ..	+++	+++	++	+	+	
A <sub>2</sub> .. ..	+++	+++	++	++	++	+
O .. ..	+++	+++	+++	+++	+++	+
O .. ..	+++	+++	+++	+++	+++	+
O .. ..	+++	+++	+++	+++	+	+
Donor's own cells	++	±				

The latest hypothesis is that of Morgan and Watkins (1948). These authors produce experimental evidence that human so-called anti-O sera (that is, sera which agglutinate O cells) can be of two distinctly different serological types; one kind, which they designate anti-H, acts similarly to "anti-O" sera of animal origin. It contains an antibody which does not react with the product of the O gene, but with a ubiquitous heterogenic H substance. This antibody can be absorbed by any material which contains the H substance (for example, human saliva). The second kind are genuine anti-O sera. The agglutinability of red cells by this type of serum indicates the presence of an O gene; this antibody can be absorbed only by O substance.

Two sera investigated by us have been found to contain agglutinins which act on O cells.

The first serum, F, was found in the blood of Mrs. F., which belonged to group A, sub-group A<sub>1</sub>, and was Rh-positive (Rh<sub>1</sub>Rh<sub>2</sub>). No atypical agglutinins could be demonstrated in a blood sample collected when Mrs. F. was one month pregnant with her third child, but shortly after delivery of a healthy full-term baby, her serum contained an antibody which acted at room temperature strongly with O and A<sub>2</sub> cells and only weakly with A<sub>1</sub> and her own cells. No reaction was obtained at 37° C. The child's blood group was A, sub-group A<sub>1</sub>, Rh<sub>1</sub>Rh<sub>2</sub>. As the father's group was B, the child must be AO. The child's red cells were not clumped by the maternal serum, nor did they give a positive reaction to the Coombs test. The atypical agglutinin could not be demonstrated in the cord serum. The maternal serum reacted with 15 further samples of adult O cells, regardless of their Rh, Lewis or P type. The possibility of an anti-O agglutinin was, therefore, considered and the following investigations were carried out.

To overcome auto-agglutination, Mrs. F.'s serum was diluted one in eight and tested against approximately 100 samples of adult group O cells, which were all agglutinated by it; a similar reaction was obtained with 30 samples of A<sub>2</sub> cells, but 50 A<sub>1</sub> cell-samples gave no, or only very weak, agglutination (thus making it very likely that the antibody present was an anti-O agglutinin), in addition to auto-agglutination of much lower titre. Titrations against samples of each type of cell are shown in Table I.

Cord blood was not agglutinated by serum F. Saliva from persons belonging to groups A<sub>1</sub>, A<sub>2</sub>, B and O did not absorb this agglutinin, nor did A and B substance (Eli Lilly) or O substance (supplied by Professor F. M. Burnet).

In a further sample of Mrs. F.'s serum, taken fifteen months after delivery, the anti-O agglutinin could no longer be detected, normal saline being used as the diluent, and only very weak agglutination was obtained when sodium citrate was used. Although no linkage between the maternal antibody and the child's red cells could be demonstrated, there seems to have been a certain amount of damage done to them, as the child's haemoglobin level was only 90% (12.7 grammes per 100 millilitres) on the fifth day, the red cell count being 4,470,000 per cubic millimetre.

The second serum, R, was found during the routine investigation of the blood of a Red Cross donor, Mrs. R. She gave no history of ever having received transfusions or of having been pregnant, and as far as she knows, she has never had any treatment involving even small injections.

TABLE II.  
Titration Tests on Serum R.

Blood Group of Cells Used.	Serum Dilutions.					
	1/2	1/4	1/8	1/16	1/32	1/64
O .. ..	++++	++++	+++	++	+	±
A <sub>1</sub> .. ..	+++	±				
A <sub>2</sub> .. ..	++++	+++	++	++	±	
Donor's own cells	++	±				

tions of blood. Her red cells belong to group A<sub>1</sub>, M and are P and Rh negative (cde/cde). When her serum was tested for Rh antibodies it was found that it agglutinated Rh<sub>1</sub>, Rh<sub>2</sub> and Rh-negative cells if they were suspended in oxalated plasma, but did not agglutinate them if normal saline was used as a cell diluent. No clumping was observed when human albumin was used as a suspending medium. Thus the possibility of a blocking phenomenon was excluded, particularly as the indirect Coombs test also gave negative results. In further tests it was found that no agglutination occurred when the cells were suspended in human serum, but they were agglutinated when citrate saline solution was used. The agglutination was fairly strong at 37° C. to a titre of 1:8, but became weaker after several hours. The clumping was much more pronounced and permanent at room temperature. There was also a certain amount of auto-agglutination.

Under certain conditions, which are described below, it was found that 60 samples of group O cells were all agglutinated by Mrs. R.'s serum. It seemed, therefore, most likely that the antibody present was related to the A B O system, for all cells agglutinated by it were uniform in their classification in this system, but different in their reaction with anti-sera for the other blood group factors; the possibility that it was an anti-O agglutinin was considered, and further titrations, as shown in Table II, were therefore carried out.

In addition to the tests on 60 samples of group O cells, tests were made with group A cells, and for these tests the serum was used in a dilution of 1:4 to overcome the effect of auto-agglutination. It strongly agglutinated all of 15 samples of A<sub>2</sub> cells, but reacted not at all, or only weakly, with 25 out of 26 samples of group A<sub>1</sub> cells, and gave moderately strong agglutination with the remaining one. The genotype of the latter was unknown, but when

TABLE III.  
Reactions of Serum R with Group O Cells, Different Diluents being Used for Cell Suspensions.<sup>1</sup>

Agglutination.			No Agglutination.		
Diluent.	Calcium.	Sodium in Excess.	Diluent.	Calcium.	Sodium in Excess.
Plasma from blood mixed with ammonium potassium oxalate	—	+	Heparinized plasma	+	+
Plasma from blood mixed with potassium oxalate	—	+	Serum	+	+
Sodium citrate	—	+	Normal saline	+	+
Sodium oxalate	—	+	Calcium saline	+	+
Mixture of normal saline and potassium oxalate	—	+	Calcium chloride	+	—
Mixture of normal saline and potassium citrate	—	+	Potassium oxalate	—	—
			Ammonium potassium oxalate	—	—
			Potassium chloride	—	—
			Potassium citrate	—	—

<sup>1</sup> In columns 2, 3, 5 and 6 in this table + indicates the presence and — the absence of calcium in excess of sodium.

different methods of A subgrouping were used its cells appeared to be slightly "stronger" than A<sub>2</sub> cells, but not quite so "strong" as most A<sub>1</sub> cells: this suggests that these blood cells may belong to an intermediate form, or, speaking in Hirsfeld's terms, to a pleiad which had more O substance than the average A<sub>1</sub> cell but less than the average A<sub>2</sub> cell.

According to Hirsfeld, Mrs. R.'s red cells must be Ac (A complete)—that is, they cannot contain any O substance and should therefore be very rich in A substance. In titration and absorption experiments, however, they did not seem to react more strongly with anti-A sera than did several other samples of group A<sub>1</sub> cells.

If the agglutinin present in Mrs. R.'s serum is anti-O agglutinin, it seems to be a naturally occurring one, as no history of immunization could be traced. However, the activity of this agglutinin was demonstrated only under certain chemical conditions. It was apparent from the discrepancy between the results obtained with cell suspension in normal saline and citrate saline that the nature of the diluent was of major importance. Different solutions were therefore examined with the results shown in Table III.

From this table, it seems that agglutination occurs only in the absence of calcium and in the presence of sodium in excess of that already in the serum. This assumption is supported by the observation that O cells are agglutinated by it when either a mixture of normal saline and potassium citrate or of normal saline and potassium oxalate is used as a diluent, although the same cells are not clumped when normal saline or potassium citrate or potassium oxalate is used. Apparently the citrate or oxalate removes the calcium, but as there is no additional sodium present, no agglutination occurs. Normal saline on the other hand adds free sodium but does not remove the calcium, and is therefore not effective.

Parish and McFarlane (1941) described a case of auto-hæmagglutination in which the reaction was inhibited by the presence of ionized calcium. In Mrs. R.'s serum the mere absence of calcium is not sufficient, but the presence of sodium excess seems also to be necessary to enable not only the strong anti-O agglutinin to act, but also the weak auto-agglutinin. If these conditions are fulfilled, this serum resembles one described by Dockeray and Sachs (1941), who suggest that auto-agglutinin is sometimes a special sort of anti-O agglutinin.

Mrs. R.'s serum agglutinated cord blood of group O. The agglutinin under discussion was completely removed by absorption with several samples of group O saliva,

and partly removed by group A<sub>1</sub> and A<sub>2</sub> and group B saliva. It was completely removed by A and B substance and by O substance.

#### Discussion.

The abnormal agglutinins in serum F and serum R have identical reactions with adult human O and A<sub>1</sub> cells in approximately the same titre, and both therefore must be regarded as "anti-O" agglutinins.

On the other hand, there are several points of difference.

1. The agglutinin in serum F is active in all the usual diluents, but that in serum R is active only in the absence of calcium and in the presence of an excess of sodium.

2. The agglutinin in serum F appears to have been produced as a result of maternal immunization by the fetus; it was not demonstrable early in pregnancy, was present at and shortly after delivery, and had disappeared again fifteen months later. An apparently similar anti-O agglutinin has been described by Henry (1946). As Mrs. F.'s child must have been of blood group AO, the stimulating antigen could have been either the recessive O gene, or Hirsfeld's species-specific O substance. In the latter case it is, of course, of no significance that the child's blood is AO. However, it is noteworthy that this antibody, even if of immune origin, does not appear to pass the placenta as readily as do some immune blood group antibodies, since it could not be detected in the cord blood, either in the free state or fixed to the infant's red cells. In this respect it resembles the anti-A and anti-B agglutinating antibodies. Also, unlike most immune blood group antibodies, it is inactive at 37° C. In the case of the agglutinin in serum R, no relationship to pregnancy or transfusion could be elicited, and it has persisted, unchanged, since first identified two years ago. It would appear, therefore, to be a naturally occurring agglutinin.

3. The agglutinin in serum F does not act on cord red cells and cannot be absorbed by human saliva or by A and B or O substance isolated from human ovarian cysts, whereas the agglutinin in serum R reacts with cord cells, and can be absorbed by saliva and by A and B and O substances.

Differences in absorption by the above-mentioned substances similar to those observed in these two sera were used by Morgan to differentiate the two types of anti-O agglutinin—namely, those which react with the human O gene antigen and those which react with the heterogenic H substance. The agglutinin in serum F would appear therefore to be true anti-O, and that in serum R to be anti-H.

TABLE IV.  
Comparison of Reactions of Adult and Cord Blood Red Cells with Serum F and Serum R, 3.5% Sodium Citrate Solution being Used as Diluent.

	F: Serum Dilutions.						R: Serum Dilutions.					
	1/2	1/4	1/8	1/16	1/32	1/64	1/2	1/4	1/8	1/16	1/32	1/64
Group O adult cells	++++	+++	+++	+++	++	+	++++	+++	+++	+++	++	+
Group O cord cells	—	—	—	—	—	—	++++	+++	+	—	—	—



TABLE V.  
Comparison of the Effects of Diluents on the Agglutination of Group O Cells with Serum R and Serum F.

Solution Suspending Cells and Diluting Serum.	Serum F: Serum Dilutions.						Serum R: Serum Dilutions.				
	1/4	1/8	1/16	1/32	1/64	1/120	1/4	1/8	1/16	1/32	1/64
Normal saline .. ..	++++	+++	++	+	±		-	-	-	-	-
Potassium oxalate ..	++++	+++	+++	+	±		-	-	-	-	-
Sodium citrate .. ..	++++	++++	++++	+++	++	±	+++	++	++	+	±
Sodium oxalate .. ..	++++	+++	+++	+++	+	±	+++	++	+		

It would follow, if these agglutinins are anti-O and anti-H respectively, that red cells in cord blood do not possess demonstrable group-specific O substance, whereas the H substance is already present, although the sensitivity of this receptor in cord cells is weaker than it is in adult cells (the titre of agglutinin of cord cells being approximately one in six of that of adult cells).

#### Summary.

1. Theories concerning the nature of O substance and corresponding agglutinins have been reviewed.
2. Two sera have been described, both of which react strongly on adult red cells of group O and A<sub>2</sub>, and weakly on cells of group A<sub>1</sub>, and on the donor's own cells.
3. Serum F is active in all the usual suspending diluents, but serum R requires the absence of calcium and the presence of an excess of sodium.
4. Both sera react at room temperature in a titre of 1:64 against adult O cells, but differ in that serum F is inactive at 37° C., while serum R still reacts at a titre of 1:8.
5. The agglutinins in serum F appear to have been produced as a result of maternal immunization by the fetus, while in the case of serum R the agglutinins would appear to be naturally occurring ones.
6. The agglutinins in serum F are not absorbed by human saliva, by A and B substance, or by O substance derived from human ovarian cysts, while the agglutinin in serum R can be absorbed by these substances. These characteristics suggest that the agglutinin in serum F is true anti-O, and that the agglutinin in serum R is anti-H as described by Morgan.
7. Serum F does not react with cord cells of group O, while serum R agglutinates them at a titre of one in 10, indicating that at birth the corresponding receptors are present but have only approximately one-sixth of the sensitivity of adult cells.

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#### MOVEMENTS AND MOTIVATIONS.<sup>1</sup>

By J. D. RUSSELL,

Psychiatrist, New South Wales Branch of the  
Repatriation Commission, Sydney.

Let no one persuade you to cure him until he has first given you his soul to be cured, for this is the great error of our day in the treatment of the human body, that physicians separate the soul from the body.

SOCRATES.

THE request that this meeting should be held to discuss the psychological approach to orthopaedics arose from the Section of Orthopaedics itself. It would seem then that the members of that specialist body are aware that "the great error" of Socrates's era is still being perpetuated in modern medicine. I myself consider that too little recognition in the past has been given by the orthopaedist to psychosomatic problems in his enthusiasm for the physical side of his work. Equally, I feel that the psychiatrist has remained far too isolated from his colleagues practising in other branches of medicine. He has been complacent in his water-tight compartment and shown insufficient urge in demonstrating to the profession the real and vital contribution that modern psychiatry has to offer to all branches of medicine.

As a student, I was taught that the diagnosis of functional disorders was to be reached by a process of first excluding organic syndromes. By exhaustive elimination and with the aid of X-ray examinations, various biochemical tests *et cetera*, one eventually postulated that the disorder was "only functional" and dismissed the patient from any further consideration. It is depressing to discover amongst recent graduates this self-same unwarrantable and hopeless approach, which disregards the fact that psychogenic disorders have positive characteristics of their own. Of course most of us find it easier to focus attention on the symptom rather than on the much vaguer and more difficult horizon of the patient as a whole. To put this another way, one might say that materialism is finite and psychology is more difficult and uncertain. Another contributing factor to this attitude is that many patients whose illness is psychologically motivated unconsciously desire that their doctor will treat their complaint as being organic. It is then therefore beyond their control, the onus is on the practitioner to produce the cure and little effort is to be expected of the patient. Other patients go further, as we all know, and resort, not in vain, to the surgeon or gynaecologist to solve their unconscious emotional problems. Yet medical students continue to be taught, and therefore so many doctors continue to practise medicine, with the idea that defects in structure account for most disease. The truth is that, in whatever field of medicine we practise, we must inevitably find ourselves in the presence of problems that can be approached in an intelligent manner only from a psycho-biological viewpoint. Medicine is very much a matter of the individual—as Alexis Carrel puts it—disease is a personal event, it consists of the individual himself and there are as many diseases as there are patients. At the same time it requires to be said that it is a matter of

<sup>1</sup> Read at a combined meeting of the Section of Orthopaedics and the Section of Neurology, Psychiatry and Neurosurgery of the New South Wales Branch of the British Medical Association on November 29, 1948.



little importance "whether the doctor is fully aware of the psychosomatic unit and consciously treats his patient as a whole, not just a localized injury or disease, or whether he does it from intuition and an inherent ability to establish a natural close contact with his patient". This last statement needs some stressing, as an appreciation of the psychological factor in medicine is not to be regarded as the field of the psychiatrist alone. Equally a knowledge of psychiatric jargon is not a requisite to an appreciation of our patients as human beings. Indeed I am conscious that the polysyllabic pedantry of the psychiatrist and the extreme views of some schools have been potent factors in the distrust of and resistance to the acceptance of psychological dynamics by the general body of the medical profession.

Turning now to the more specific aspects of this paper, one might perhaps question the singling out of one particular speciality for analysis and study of its psychology. The orthopaedic surgeon is usually thought of "as working with chisel and mallet, adapting and incorporating hardware to and into the human body or encasing with plaster of Paris"—a craftsman in *excelsis*. We do not easily associate him with psychology and psychotherapy. These topics would seem remote from diseases of bones and joints. But it must be realized that other things need consideration by the orthopaedist besides perfect apposition of fractures or the fit of a bone graft or a plaster cast that snugly encases a limb. These matters are the mechanistic part of his work and obey the laws of physics; a dutiful adherence to such laws alone is responsible for his failure to achieve at times successful end results. The mechanistic approach alone to human problems has been aptly compared by Henry V. Dicks (1947) in his "Clinical Studies in Psychopathology" to

the attempt to explain the music of a violin by the effect of horsehair scraping on cat's entrails. There is nothing wrong with such an attempt except that it misses all that is essential.

The orthopaedist's responsibilities are wider. He has to appreciate the psychic as well as the physical component in disease. His horizon is required to expand to an awareness of the total social position of his patients. Such statements as these have often been made, indeed it is the fashion nowadays to pay at least lip service to such medical ideals. In elaboration, I would say that the orthopaedist is required in the first place to abandon the classical shibboleth of the division of disease into "functional" and "organic". The need for scrapping such a concept is well stated by Weiss and English (1947).

The day is near at hand for the final outmoding of the "either or" concept (either functional or organic) in diagnosis and to place in its stead the idea of how much of one and how much of the other, that is, how much of the problem is emotional and how much physical.

Adopting such a formulation the orthopaedic surgeon can answer the question: "Does the patient need surgery alone or personal adjustment alone, or both?" Automatically then patients can be grouped into three main classes: (i) those requiring orthopaedic care predominantly, (ii) those whose orthopaedic complaint merely masks a mental derangement, which is the real condition for treatment, and (iii) those needing both orthopaedic care and psychiatric attention, even if the latter is confined to simple readjustment of personal attitudes, family tensions or work situations. Such a grouping implies the recognition of the patient as an integrated whole—as a dynamic entity in a field of forces in which he interacts and has interacted. But it does not require of the orthopaedist the taking of a long comprehensive case history such as is taken by the psychiatrist, but rather the inclusion in his accustomed clinical history of additional information on aetiology. James L. Halliday (1937, 1938, 1942), who has written a series of worthwhile papers on "Psychological Factors in Rheumatism", recommends that such additional knowledge be obtained by attempting to answer the following three questions:

1. What kind of a person is this? That is to say, with what constitution, diathesis or pattern did he enter the

world and how has that been modified by his environment both physical and psychological?

2. Why of all the days and weeks of his life did he take ill when he did? This is an inquiry into the environmental factors he encountered about that time which were of a potency and nature likely to cause him to react by illness.

3. Why did he take ill in the manner he did? For instance, why after a bereavement may one person remain well, another develop asthma, another disordered action of the heart, another rheumatism?

One must admit readily that full answers to these three questions are not possible in the present state of our knowledge, but attempts to answer them inevitably throw much light on to all types of illness. To illustrate their value I quote a simple case history of a young lady interviewed quite recently.

M.E., aged seventeen years, has been referred by an orthopaedic surgeon with the diagnosis of hysteria. Twelve months ago she developed pain and a spasmodic valgoid deformity of her right foot. Since the onset of this condition she has had her foot in plaster casts on three occasions for in all twenty-one weeks, she has had all her teeth removed, and latterly she has worn special boot and iron. Now to our questions.

1. What kind of a person is she? Physically she is well built and nourished. Mentally she is of dull normal intelligence, immature for her years, the youngest by ten years of a family of six children. She evinces little concern for her disability.

2. Why did she fall ill when she did? Her mother is over-protective and fussing, and in front of her daughter expresses her concern, saying: "It's terrible to see her stricken down like this." The daughter readily expresses her resentment at having to leave school at the age of fifteen years in order to care for her mother, who was ill at the time. After two months she was sent to work as a machinist, again against her own wishes. She used a treadle sewing machine at her employment and disliked the trade and work intensely. Despite her unhappiness she kept at this work for two years. Just prior to the onset of her foot disability she decided that she wanted to become a nurse. Her mother would not listen to such a suggestion. The pain and spasmodic eversion of her right foot commenced dramatically whilst she was at work soon thereafter, pedalling her treadle machine.

3. Why did she fall ill in the way she did? In this case we require to ascertain the reason for the particular site of hysterical conversion. Why was it the legs and more specifically the right leg? The connexion with her occupation is obvious. Her foot disability rendered her unable to continue in distasteful employment. She was in no way to be blamed and self-respect could thus be maintained. She gives a history, corroborated by her mother, of an injury requiring medical attention to her right ankle at the age of two years. One can regard earlier trauma as a common determinant of the site of an hysterical conversion, this being a place of lesser resistance or akin to Adler's organ inferiority; the mechanism is seen frequently in industrial traumatic neuroses.

This brief exposition of Halliday's three questions gives us readily and with little effort a classical picture of hysteria in an immature girl whose attitude to her mother was a mixture of aggression and dependence. Her illness relieved her from a distasteful form of employment, made her a figure of some interest and importance, permitted her to vent her aggression on her mother, causing the latter worry and concern, and has now broken down her mother's resistance to a change of occupation to nursing—that is, provided any training hospital is misguided enough to have her. Truly hysteria represents "power through weakness". Her hysterical spasm cleared with persuasion and "Pentothal" hypnarcosis and, I must add, the mother's permission to a change of occupation as outlined above; perhaps the last-mentioned factor was therapeutically the most significant.

Our case history has been completed and from it we can draw attention to factors that are always important in considering a diagnosis of hysteria: (a) the dramatic nature and mode of onset of symptoms, so frequently without trauma or with minor trauma; (b) the possibility that the symptoms are of some value to the patient by providing him with a solution although maybe an unsatisfactory one to his difficulties—in other words, that there is an emotional need behind the hysterical symptom; (c) the emotional

attitude to the symptoms, the patient's desire to draw attention and sympathy to himself though consciously he behaves as if nothing was further from his mind; (d) the tendency in his previous personality to seek the limelight and to create an impression.

I offer to you the above-mentioned three questions devised by Halliday as a useful method of psychological approach to be included in examination of patients. It lays stress on the significance of the situation present when the illness has occurred. It requires no particular or special knowledge of psychopathology. It will widen the range of observations with the result that treatment will be more effective.

Next, I should like to discuss the evergreen problem of backache and the so-called entity of fibrositis. I note that at the recent Perth Congress the Section of Orthopaedics and Physical Medicine devoted much of its time to a consideration of back injuries and that will-of-the-wisp, the fibrous nodule. In culling through the abbreviated report of the proceedings in *THE MEDICAL JOURNAL OF AUSTRALIA* (1948), one notes the confidence and certainty with which the intervertebral disk lesions were discussed and the compound fractures, but consideration of the common back injury with radiologically negative findings led to such lamentations as that "no precise criteria had been given for the diagnosis or treatment of those vague conditions" and, from another speaker, "where and why the functional element entered the picture was difficult to estimate". Another said "... fibrous nodules did occur", another that "he did not think fat nodules were an important cause of backache"; and my last excerpt is a speculative wonder "why some patients did well and others did not". I quote these passages in no sense of derision. I am conscious of the need for humility in our approach to medicine, of the relatively little amount we know, and of how frequently doubt and uncertainty beset us all. But I do suggest that a wider awareness in orthopaedic work would remove some of the indecision and perplexity surrounding the subjects of fibrositis and backache. In part, I have already indicated what such a wider awareness connotes. I would suggest that less attention should be focused on securing a label and more on ascertaining the cause. So often the label is supplied by the radiologist, whose findings are frequently given an importance and weight in the aetiological picture beyond their real worth. Such radiological evidence as the presence of osteophytes, *spina bifida occulta*, or narrowing of the intervertebral joint space is too eagerly seized upon at times as a complete fulfilment of the bill of causation. The corrective to such a myopic attitude is a realization that X-ray findings are merely one clue in the jig-saw puzzle of aetiology, and that an equally important part in the completion of the picture is to be obtained from a simple psychological evaluation of the patient.

In further more specific reference to fibrositis and backache, I wish to direct attention to the intimate relationship that exists between emotional state of mind and tonus of skeletal and visceral muscle. To equate mental and muscular tension is undeniably correct. Indeed one might say that the dynamic role of emotional states in the production of bodily changes is not now challenged, as witness the correlation between repressed emotion and such conditions as peptic ulcer, hypertension and thyrotoxicosis. Psychiatrists have as their everyday tasks the care of states of prolonged emotional tension. I refer of course to the anxiety states. So frequently in these conditions, in addition to smooth muscle tensions, complaints are made of headache. Classically the headache is of the tight-band-around-the-head type and/or suboccipital in situation. These headaches can be explained as striated muscle disturbances due to long continued spasm. Again the exaggerated response of the knee jerk and the tremor of the outstretched fingers found classically in anxiety betoken the self-same increase in voluntary muscle tonus. And then we all recognize the furrowed and creased foreheads of those chronically worrying people whom we designate as the constitutionally anxious personality type. Therefore it is reasonable to conclude that emotional tension may evoke a response from muscles smooth or striated, involun-

tary or voluntary, and that response frequently is one of increased tone. How such an interaction of body and mind occurs requires further basic psychosomatic research for its elucidation, but its application in orthopaedics to the explanation of certain aspects of non-articular rheumatism or fibrositis and backache is long overdue. I fail to see any vital or really worth-while distinction between the condition of a labourer worried by insecurity and domestically unhappy who accumulates resentment against society and his employer that crystallizes round a minor injury to his back so that he escapes an intolerable situation—and, say, a gastric neurosis. Each reaction can be simply regarded as a tag on which the patient projects his previously existing problems. Indeed in the matter of trauma, one can go further and say that injury may at times be received as a welcome climax as presenting a solution to the patient's personal problems.

The following case history illustrates some of the vicissitudes of the chronic backache.

A man, aged thirty-six years, was called up for ninety days' full-time training in 1941. Within thirty days of call-up he had been absent without leave and was then admitted to a camp hospital suffering from lumbar fibrositis. The mode of onset was, in his own words, as follows: "I was helping to carry timber and backed onto some other timber. It hurt on the spur of the moment, but I continued to work and slept all night. Next morning I had severe pain in my back and could not move my legs at all." He spent quite a proportion of his ninety days' camp being absent without leave, in hospital and on sick leave. In 1942 he was again called up, this time for full-time duty with the military police. After six months he was discharged from the Provost Corps because of his misconduct and sent to Darwin in an ordinary unit. There he developed a recurrence of his back pain "on bending to pick up a drill"; more hospital treatment and physiotherapy followed and he improved, but "broke down on a route march" as soon as he rejoined his unit. He was then evacuated to 113 Australian General Hospital, and with further physical therapy, plus the application of a plaster cast, again improved. Eventually he was medically "boarded" with the diagnosis of "injury to back" and awarded a 15% pension in 1945. Since his discharge from the army treatment by plaster casts, physiotherapy and injections of local anaesthetics has continued. On the last admission to hospital he was transported a distance of 100 miles to the Repatriation General Hospital, Concord, by ambulance, as he was "very ill". At no stage of his illness have X-ray examinations shown any abnormality and, in his own words, "the backache always comes on of itself". Recently he was referred for psychiatric examination. Additional information revealed him to be the only child of a second marriage. His father was a heavy drinker, his parents separated when he was a child. His father was a coal-miner, who was retired on medical grounds after sustaining a fractured spine in the mines. As a boy he was uncontrollable; he was a truant and an inmate of Mittagong Boys' Home for two years for stealing. His service documents show many disciplinary breaches and he is addicted to alcohol. His employment before the war was varied and casual. Since the war it has consisted of medical attention interspersed with occasional working periods. His pension rate is now 50% and includes lately an entitlement for peptic ulcer as well as for injury to the back.

After seven years of a musculo-skeletal approach to this hysterical psychopath, I felt that I did not possess the necessary skill to launch a psychotherapeutic attack. The case history, however, will serve to illustrate further points of interest.

Firstly, the site of the presenting complaint was his back. One notes here an identification with family figures—in this case his father, who suffered a severe back injury. One recognizes that the assumption of symptoms from which a parent at one time suffered is a common unconscious determinant of the nature and situation of hysterical conversion.

Secondly, attention is drawn to the fact that, if hysterical conversion symptoms are left untreated, the abnormal behaviour pattern rapidly becomes ingrained, conditioned fears take a firm hold and attempts at removal of symptoms become increasingly difficult; their removal in this case is, I feel, impossible. Hysterical conversion requires therefore early recognition and treatment.

Thirdly, it is all too frequently assumed that a traumatic experience produces a psychopathological state *de novo*.

Yet when investigations are searching it is rare to find a case in which evidence of existing psychopathological characteristics cannot be detected in the previous history. Trauma therefore often precipitates a psychoneurosis by activating existing but latent morbid personality factors, as in the case under discussion.

Fourthly, reaction to injury in any part of the body may occur, usually after a latent period, in the form of a traumatic neurosis. This latent period, depicted in this case as a period of the best part of a day, is filled with ill-defined ruminations of an imaginative wish-determined and suggestive nature, the memory of which is hazy and difficult to recover. You will recall that the original injury in the soldier under discussion was a minor one; he continued at work, slept all night and woke up next morning with severe lumbosacral pain and inability to move his legs.

Finally, the motivation is fairly obvious. His adjustment to army life was always inadequate, as it has been to all life situations. His illness permitted him some sort of limited adaptation to service life, spared him any arduous duties, got him out of an operational area, and introduces us to the secondary gain factor, which has accrued now in the form of a pension and an alibi and protection from hard physical work in the future. His present attitude is one of self-satisfied dignity: "I did my job, doctor, I soldiered on." It is commonplace to state that the possibility that some advantage or compensation may accrue to a patient as a result of trauma usually conduces to the development of a traumatic neurosis. The motive, as we know, is often unwittingly aided by an alarmist doctor, by solicitous relatives and, in compensation cases, by the misguided zeal of members of the legal profession.

This brings me to the consideration of two further points in relation to trauma and the development of a neurosis. The first concerns older patients. We find at the Repatriation General Hospital, Concord, that hysterical conversion following injury is by no means uncommon amongst those in the older age groups with a correspondingly poor prognosis. Frequently instead a reactive depression is carried on into a chronic depressive illness as the effort or the prospect of having to make the effort to start afresh in the economic field proves too great. Such a reaction is understandable and inevitably leads to failure to improve under treatment with the retention and fixity of symptoms. Thus is obtained relief from the struggle for what was possibly an insecure livelihood and the secondary gain of a certain welcome degree of domination over the environment.

The second point relates to the part we play as medical practitioners in increasing the incidence and in the fixation of traumatic neuroses—the so-called iatrogenic factor. Preferably any suggestion to the patient that an injury is serious should be carefully avoided. Most of us doctors adopt the slogan "if in doubt take the serious view". For our own *amour propre* and that of our patient such an attitude is comforting. It is a safe attitude for us, but it is fraught with the possibility of a traumatic neurosis for the patient. Another faulty attitude of the physician is one of suspicion or antagonism. This is common in the practitioner who considers all hysterics malingerers and mistakenly believes that the hysteric could control his symptoms if he would. A biased sceptical attitude, a refusal to listen to complaints, the making of but a superficial examination—these things destroy the possibility of *rapprochement* and contribute materially to psychological elaborations. Such disregard and veiled antipathy are reacted to by resentment and discouragement, and they stimulate unwholesome patterns of reaction.

The next case history concerns a man, aged thirty-seven years, an ex-flight engineer of the Royal Australian Air Force. He originally complained of pain in the lower part of his back on the left side about Christmas time, 1943. He was then engaged as a member of a crew flying Catalinas operationally. The only traumatic experience he could relate to his back pain was being "shaken up" in a landing accident some fifteen months previously. He was admitted to hospital in North Queensland and later to 113 Australian General Hospital. Here he was treated by injections of local anaesthetics, he had all his teeth removed and a fibrous nodule was excised from his left buttock.

X-ray examination suggested an anterior displacement of the fifth lumbar vertebra on the first sacral vertebra in March, 1945. The pain by now had spread to his left knee.

His symptoms persisted and were noted to include insomnia, fatigue, irritability and over-concern for his painful back. In 1945 he was medically "boarded" after having psychiatric treatment, the diagnosis being "anxiety state which diagnosis includes back symptoms". After discharge, in 1946, he was examined by both a psychiatrist and an orthopaedic surgeon. The former reported a "vertebral neurosis"; the latter noted "incomplete *spina bifida occulta*, abnormal intervertebral articular joints and loss of joint space between L5 and S1, which could cause present symptoms". A plaster jacket was applied for four months. The patient was no better, and still complained of pain in the lower part of his back and in his leg. Manipulation under ether anaesthesia was also ineffective, as was an ileal belt, so spinal fusion of the lumbosacral articulation by means of a bone graft from the tibia was performed seven months ago. Recently he was admitted to a psychiatric ward and was still wearing a plaster of Paris spinal jacket. He was noted as resentful, aggrieved and hypochondriacal, complaining still of backache, irritability and insomnia. It was learnt that he had lost his job in the Public Service recently as a result of his continued ill health. His marriage has been a cause of unhappiness and discord for some years now. His wife on interview complains of his excessive alcoholic indulgence and his violence at times. Finally they are in debt. His present pension rate is "100% plus T. and T.I."

I consider that the prognosis here is poor, despite the technical excellence of the operative procedure as shown by post-operative X-ray examination. The error lies in seeking the answer to the patient's symptoms in terms of the faulty structure of his fifth lumbar and first sacral vertebrae alone and disregarding the faulty structure of his personality. I feel that in other than emergency orthopaedic surgery, that is, in procedures of election that deal with chronic orthopaedic conditions, an estimate of the total individual with a knowledge of his personal problems is an essential requirement. By obtaining this the orthopaedic surgeon would in large measure spare himself and his patient the disappointment of the technically perfect but basically unsuccessful operation.

As a Royal Australian Air Force medical officer and president of medical boards during the war years, one could not but notice the variability in the end results of technically perfect operative procedures in orthopaedics. One of the commonest operations—that for the removal of a meniscus from the knee joint—resulted at times in return to full duty veritably in a few weeks. At other times the end picture was that of a limping, complaining invalid with permanent quadriceps wasting, requiring to be regarded as permanently medically unfit and as having a pensionable degree of incapacity. Such variation in end operative results was a common subject for discussion amongst service medical officers. Surely the answer to it is to be sought in the patient himself—in his inadequate attitude. Those who were keen, and in other words whose attitude to service life was adequate, were ever doing quadriceps drill and actively using their knee joint and vying with their fellows to increase the stability of their knee. In contradistinction to this, were those who, despite encouragement and persuasion, could not be made to persevere, sought ever to rest, and made complaints of pain and stiffness their alibi. Without doubt most of these faulty operative results in faulty personalities could have been obviated.

In this regard, it is pleasing to record that for some little time now at the Repatriation General Hospital, Concord, the general surgeons have been referring some of their patients to the psychiatric division for personality assessments. Particularly they have requested opinion in operations contemplated for the alleviation of peptic ulcer by partial gastrectomy or vagotomy. They require psychiatric appraisal with an opinion as to whether operation would be utilized by the patient for ingraining and perpetuating his complaints or whether his attitude, integration and stability are of such degree as to suggest a worth-while end result. This liaison between surgeon and psychiatrist has been fostered by Dr. D. Ross and Dr. I. Simpson at Concord, and can be productive of nothing



but good to patient, surgeon and psychiatrist alike. Too often the psychiatrist is presented for treatment with the operative failures of his surgically minded colleagues. Such patients are inevitably failures in his hands also. For no psychiatric treatment will endow a patient with qualities of stamina he never previously possessed, or give him that fundamental constitutional stability required for a good prognosis.

In concluding this inadequate survey of some aspects of the orthopedic surgeon's work from the viewpoint of psychiatry, I am conscious of my many omissions. Most are deliberate, as I have tried to keep within the bounds of my own limited experience. Much time has been devoted to motivation, little to movement. I have freely borrowed from many authorities. Finally, to give force to my argument, I have selected case material unflattering to the orthopedist. If any emotional tension is caused thereby, I would suggest, as a measure of retribution, a further combined meeting at which an orthopedic surgeon might take as his subject "Compression Fractures of the Spine Following Electric Convulsion Therapy".

My thanks are due to the Chairman of the Repatriation Commission for permission to use two case histories.

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### HERPES ZOSTER OF THE NERVUS CHORDA TYMPANI WITH FACIAL PARALYSIS.

By J. PARKES FINDLAY,  
 Sydney.

RAMSAY HUNT has described a syndrome in *herpes zoster oticus* with an associated facial paralysis (Bell's palsy). This syndrome, due to involvement of the geniculate ganglion, manifests itself with herpetic eruption of the tympanic membrane and posterior wall of the external canal of the ear, tinnitus, hearing loss, vomiting, vertigo and nystagmus. In 1933 I reported five cases of this syndrome. I am now able to describe a case of geniculate ganglion infection, in which the *nervus chorda tympani* was involved with herpetic eruption of the side and dorsal surface of the anterior two-thirds of the tongue, associated with facial paralysis of the lower motor neuron type (Bell's palsy).

As far as I am able to ascertain from the literature available, there is no further published work on geniculate infection with *herpes zoster* of the *nervus chorda tympani* and associated facial paralysis since Hunt's report of one case (1915). In the same publication he mentions four cases which he had collected from the literature, circa 1880 to 1895.

O'Donnell and Murphy (1941) report two cases of *herpes zoster*. In the first case described herpetic eruption of the anterior two-thirds of the side of the tongue was present, with associated herpes of the face involving the third division of the fifth nerve. There was no facial paralysis. Wakeley and Mulvany (1939) comment upon "the rarity of vesicles in the anterior two-thirds of the tongue". Hill (1936) states that "vesicles are often seen in the anterior two-thirds of the tongue". Brain and Strauss (1934) state that "geniculate zoster is normally associated with typical zoster vesicles in the auricle, and less often on the tongue".

Hunt agrees that all geniculate involvement is associated with facial paralysis. Herpes of only the tongue demonstrates that sensory fibres to this organ may come from a link-up with the glossopharyngeal nerve.

#### Ætiology.

The condition may be due to (1) toxic infection or (2) virus infection.

Toxic infection from focal sepsis plays an aggravating part in *herpes zoster* of the geniculate ganglion. The five cases reported by me in 1933 were aggravated by a focal septic source. The septic foci were eliminated by surgery in four of the cases observed, and in each a complete recovery was made.

In the case mentioned in this paper the condition was most probably due to virus infection, no focal sepsis being detected, and the possible source being an attack of influenza 10 days previously, and the portal of entry of the virus is via the mouth or fauces.



FIGURE I.

#### Anatomy.

The *nervus chorda tympani* branch of the facial nerve carries secretory fibres from the superior salivatory nucleus, special visceral sensory fibres (taste), and also sympathetic fibres to the salivary glands. The sensory portion carries taste fibres from the anterior two-thirds of the tongue to the geniculate ganglion of the facial nerve; the fibres continue from the ganglion, along with fibres of the greater superficial petrosal nerve, to form the *nervus intermedius* (nerve of Wrisberg), the central fibres ending in the *tractus solitarius*.

#### Symptoms and Signs.

The symptoms and signs of facial paralysis (Bell's palsy) are well known and need not be enumerated.

The involvement in the present case showed a definite selectivity in its attack on the geniculate ganglion, singling out the *nervus chorda tympani* fibres; the result was loss of taste, a dry mouth due to loss of salivary

secretion, and a tender tongue with a burning sensation along the side and dorsum, marked by an herpetic eruption of this region. The tongue is swollen and sore, causing difficulty in eating. The patient is worried and anxious.

In my opinion, the syndrome described by Ramsay Hunt is due to an extension of the inflammation from the geniculate ganglion, spreading proximally via the *nervus intermedius* to the eighth nerve.

#### Diagnosis.

Lesions above the nucleus are of upper motor neuron type, and the upper facial muscles are not affected. The tongue may be involved; there is no reaction of degeneration to the electric current.

Nuclear lesions are rare.

Lesions between the geniculate ganglion and where the facial nerve leaves the pons produce a lower motor neuron paralysis, and a disturbance of taste, tears and saliva, with hyperacusis.



FIGURE II.

Lesions between the geniculate ganglion and the *nervus stapedi* produce diminished salivary secretion and loss of taste; the tears are not affected.

Lesions between the *nervus stapidi* and the *nervus chorda tympani* produce loss of taste and diminution of saliva; hearing is not affected.

#### Electric Current Tests.

Lesions of lower motor neuron type produce loss of response to faradism at an early stage. This is due to the chronaxy of the muscles being lengthened as described by Kettel. In the initial stage muscles respond to faradism, later giving the reactions of degeneration to galvanism.

#### Treatment.

The causative factors determine the treatment of the facial paralysis. Virus inflammation of the geniculate ganglion demands a searching examination for focal sepsis; if this is localized, immediate remedying measures should be instituted. For the anxious state the patient should be

given heavy sedation and local treatment should be applied to the tongue.

Gentle galvanism is suggested by Wilson for the facial muscles for fifteen minutes every day, with massage to prevent the flaccid muscles from sagging (Wilson suggests the anode as the active electrode for the galvanism).

#### Surgical Treatment.

In my article on decompression of the facial nerve, I urged that operation should be performed to give the patient the maximum opportunity for a complete recovery with restoration to normal function of the facial muscles. In the decompression operation I now use an endaural attico-antrotomy approach, the same as for fenestration, if the geniculate ganglion is involved.

In the cases in which disorders of the *vasa nervorum* have been diagnosed and it is intended only to decompress the facial nerve from the stylomastoid foramen to the lateral semicircular canal, I prefer the external incision commencing at the tip of the mastoid, as performed by Tickle.

Many writers have expressed themselves as to the most appropriate time for surgical interference. Ballance and Duel in their published work advise operation; Tickle of New York, Sullivan of Toronto, and Kettel of Denmark, have reported many cases of decompression of the facial nerve with successful results. I discussed this problem with the last-mentioned three specialists last year, and observed their operative technique. The consensus of opinion about the time of operation is from six to eight weeks from the onset of the paralysis, when the continuing mobility of the facial muscles can be demonstrated clinically to have eased.

#### Report of a Case.

Mrs. L. McT., aged fifty-four years, was referred for examination three days after the onset of facial paralysis. She gave the following history.

Early one morning about seven days after an attack of "influenza", she had noticed a burning sensation on the right side and tip of her tongue. She found eating and drinking difficult, as the tongue became swollen and tender. Next morning her face suddenly became lop-sided, and it was impossible for her to close her right eye. On the side and top surface of her tongue blisters appeared, extending to the tip. Eating and drinking were painful, her mouth and tongue being dry, and she could not taste her food. She became worried. That night a bursting noise occurred in her right ear, but gradually disappeared. On the third day she sought medical attention.

On examination the patient looked worried and anxious. Complete right massive facial paralysis (Bell's type) was present. No lesions were detected in the ear, nose or pharynx. Hearing was normal. The ocular fundi were normal. On the tongue, severe herpes zoster of the anterior two-thirds was present, on the side, along the right border of the dorsum, and on the tip. The tongue was dry and swollen. Many of the vesicles had ruptured and had white sloughs. When the sloughs were removed hæmorrhage occurred. It was painful on being touched, and also on protrusion. The response to galvanism was present. Faradism produced a poor response from all muscles.

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### SOME OBSERVATIONS ON THE 24-HOUR "HYPERÆMIA" BIOLOGICAL TEST FOR PREGNANCY.

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The original Aschheim-Zondek test (Zondek, Salmon and Black, 1945) was developed in Germany in the late nineteen-twenties in an attempt to satisfy the demand for a reliable test of early pregnancy. With this technique five infantile mice were injected subcutaneously over a 72-hour period with 1.8 to 2.4 millilitres of the urine to be tested (six injections of 0.3 to 0.4 millilitre) and the ovaries were inspected after ninety-six hours. A positive result was shown by the formation of hæmorrhagic follicles (so-called "blood dots") and of *corpora lutea*, the test taking four days to complete. This test was accurate (error of less than 1%) and was found to be a reliable and satisfactory basis for the diagnosis of early pregnancy. The use of this test in clinical cases was a tremendous advance, and the principles on which it was based have led directly to all the modern discoveries of the important endocrine factors in sexual physiology.

#### Modifications of the Original Test.

As a routine test the original method had the disadvantage of requiring four days to complete, and within recent years attempts have been made to shorten the time required to give a result. Firstly, it was thought that if the gonadotrophic hormone in the urine could be concentrated by chemical methods, the concentrated dose would give a quicker response. However, these methods were complicated and found to be rather inaccurate compared with the original test and were abandoned.

After this, Friedman (1929, 1931), using female rabbits and injecting 10 to 12 millilitres of the urine intravenously, obtained a result in thirty-six to forty-eight hours. However, the rabbits had to be kept isolated for four weeks before use and spontaneous ovulation sometimes occurs; also, they occupy a large amount of space, which is not always readily available.

More recent attempts to solve the problem have been concerned with using the hyperæmia of the ovary as the indicator reaction rather than the formation of *corpora lutea*. It was seen that after the injection of urine containing gonadotrophic hormones the ovaries of suitable animals became hyperæmic, often within two hours, but very distinctly so within twenty-four hours. The formation of *corpora lutea*, on the other hand, does not develop until about ninety-six hours after the injection.

#### The Development of the "Hyperæmia" Test.

In immature mice and rabbits the ovary is of a rather pinkish colour normally, but in the rat it is quite white, so that it contrasts sharply with a deep red swollen ovary seen in the "hyperæmic reaction". The rat was therefore selected as the test animal. Walker and Walker (1938), using immature female rats thirty to forty days

old, injected 0.5 millilitre of urine three times in a single day and killed the rat thirty hours after the first injection. They compared the results obtained with those of the routine test in 153 cases and found them identical.

Frank and Berman (1941) used two immature female rats (50 grammes in weight); each rat received 10 millilitres of urine (five millilitres at 10 a.m., five millilitres at 4 p.m.) and was killed next day (24-hour test). They read the ovarian reaction by gross inspection and by loupe magnification with transmitted light. They performed 201 tests (in 98 cases parallel with Friedman tests). The results were compared with the clinical history and were correct in all but two cases (97 tests gave a negative and 104 a positive result). Of the cases in which results were incorrect, a positive 24-hour result was obtained in one, but the patient was only four days over the expected time of her menstruation and on the following day had a hæmorrhage. In the other case a doubtful ectopic pregnancy was present. Here also a positive result was obtained, but repeat tests one week later gave a negative result for both the 24-hour and the routine Friedman tests.

Salmon, Geist, Salmon and Frank (1942) attempted to reduce the time to six hours. They compared the hyperæmia of the ovary at the end of six hours with the oedema and oestrogenic stimulation of the vagina at the end of twenty-four hours. They described the ovarian reaction as a characteristic vascular congestion, the ovaries being a bright red colour in contrast to the white or faint pink of control ovaries. The reaction was always present at the end of six hours and was often as marked at the end of six as at the end of twenty-four hours. At the end of twenty-four hours the vagina was noticeably thicker and broader. Microscopically there was proliferation of the epithelium and hypertrophy and oedema of the muscularis. This reaction was most marked at the end of twenty-four hours and was not evident till after twelve hours.

They found that in the case of normal pregnant women a variation of the quantity of urine injected from one to eight millilitres and of the size of the test animals from 30 to 50 grammes did not influence the resulting reactions. In the six-hour test three immature rats were injected subcutaneously with two millilitres of urine and were killed and examined at the end of six hours. In the 24-hour test two immature rats were injected subcutaneously with two millilitres of urine and killed and examined at the end of twenty-four hours.

Their results show in the six-hour test that all the results corresponded with the clinical findings except one in which there was a negative reading. In this case the patient was only five days over the time for her normal menstruation and the test repeated one week later gave a strongly positive result. The specimens of urine used in these tests were obtained from 110 patients, 78 from pregnant women (gestation varying from 18 to 280 days), one from a patient with chorionepithelioma and 31 from non-pregnant patients who were classified in one of the following groups: normal healthy woman shortly before the onset of normal menstruation, women with primary and secondary amenorrhœa, women after the menopause, women with functional sterility and delayed menstrual periods, women with adrenal cortex carcinoma and, finally, normal men. In the 24-hour test 118 urine specimens were used, 61 from normal pregnant women, 57 from non-pregnant women (those with a normal cycle, menopausal subjects, ovariectomized patients and those with amenorrhœa). In these tests the results were correct in all but two cases; in one case a negative result was obtained from a patient four days after the time of menstruation; in the other the ovarian reaction was negative and the vaginal reaction was positive in a patient only ten days from the onset of labour at full term. The result in this last case was explained by the low concentration of gonadotrophic hormone present at this advanced stage of pregnancy.

Kaminester (1944) repeated the six-hour test in rats of 30 grammes weight (four weeks old). He injected two millilitres of urine subcutaneously into each animal and inspected the ovaries in six hours. He obtained the correct result with 61 out of 62 pregnant women. Of 44 cases of



non-pregnancy the results in 43 were negative; and in one case the result was read as positive, but it was in the early stages of the investigation and probably the result should have been read as negative.

Farris (1944) attempted to reduce the time still further and killed the rats in two hours. However, although he found that all specimens of urine during pregnancy gave a positive result, many other conditions also caused a reaction and the test was not specific for pregnancy.

Zondek, Salmon and Black (1944) in a comprehensive article have reviewed the literature of the hormone pregnancy test and presented their results from an extensive series of investigations. They have performed the two-hour, six-hour and 24-hour tests and compared the results with the clinical condition and with the original four-day test. In a series of 300 cases, with the two-hour test used in 98 cases of early pregnancy, 33 false negative results were obtained and seven false negative results in 30 cases of late pregnancy (four to nine months). However, in all cases in which the result was positive the woman was found to be pregnant. With the six-hour test there were 11 false results. Here again the test was reliable if the result was positive, but not conclusive if the result was negative. With the 24-hour test, in 98 cases of early pregnancy and 30 cases of late pregnancy all the results proved correct. On the other hand, there were three false positive results in the control group. These were in (i) a case of *myoma uteri*, (ii) a case of *pseudomyxoma peritonei*, and (iii) a case of *corpus luteum persistens*. These three cases would give an error to the test of 1%. This would be as reliable as the original 96-hour test.

#### The Present Investigation.

For the purposes of this investigation it was decided to compare the hyperæmia (24-hour) test with the routine test as used in this laboratory and with the clinical history of the patient. The technique for the 24-hour test used was that described by Zondek *et alii* (1945). An immature female rat (30 to 50 grammes in weight) was injected into the flank with two millilitres of urine. This was repeated into the opposite flank in one hour (a total of four millilitres of urine injected). The rat was killed after twenty-four hours with coal gas and the ovaries were inspected. With a positive result the ovaries were enlarged and of a deep red colour and contrasted greatly with the small white ovary found with a negative result. In the routine test the immature rat is given a subcutaneous injection of 0.5 millilitre of urine twice daily for three days. It receives no injections on the fourth day and is killed on the fifth. The ovaries are inspected for *corpora lutea* both macroscopically and also microscopically after paraffin sections have been prepared within six hours.

Of 100 cases the results in 87 corresponded with that of the routine test, 54 being positive and 33 negative. In three cases a positive result from the 24-hour test was confirmed clinically, but the routine test had not been done. In two cases the result of the 24-hour test was positive and that of the routine test doubtful; in both of these cases the patient aborted soon after. In three cases the result of the 24-hour test was positive and that of the routine test negative; one patient later was proved to be twenty-six weeks pregnant, and the result of the routine test repeated two weeks later was positive; the second patient had a uterus enlarged to the size of a three-months pregnancy and subsequently had an abortion; the third patient had been sterile for eight years; she usually had regular menstruation, but was now two weeks over the expected time of her menstruation, and both the 24-hour test and the routine test yielded positive results when repeated one week later. In three cases the result of the 24-hour test was negative and that of the routine test positive; in each case the clinical diagnosis was "not pregnant"; the first patient had had a confinement four months before and no menstrual periods since, and pregnancy did not subsequently develop; the second patient had a normal-sized uterus, but her menstrual period was one week late and of one day's duration, and curettage produced some thickened endometrium but nothing to suggest pregnancy; the third patient's uterus was firm and

enlarged to the size of an eight-weeks pregnancy, but she had always had irregular menstruation and, as later examination showed her condition to be unchanged, she was considered to have been "not pregnant". In two cases the result of the 24-hour test was read as positive and that of the routine test as doubtful, but the routine test on repetition gave a negative result; clinical details were not available in these two cases, but it was felt that the result of the 24-hour test had been wrongly interpreted and should have been read as negative.

#### Results.

To sum up, the results of the hyperæmia test in a small series of 100 cases were as follows. In 98 cases the result agreed with the clinical condition. In eight of these cases the hyperæmia test gave a different result from that of the routine test. In three cases of proven pregnancy and two cases of incomplete abortion the result of the hyperæmia test was correct at a stage when the hormone was apparently not able to cause a definitely positive result in the routine test. In the three cases in which negative results were obtained from the 24-hour test, but positive results from the routine test, there was evidence of some endocrine disturbance, but the suspicion of pregnancy was not substantiated. There were only two results which could be regarded as misleading, and these were in the early stages of the investigation. The results in our series would therefore establish the hyperæmic reaction as quite an accurate and specific one on which to base a pregnancy test. This is in agreement with the findings of numerous previous investigators whose results are briefly reviewed.

#### Discussion.

The Aschheim-Zondek test is dependent on the fact that gonadotrophic hormone is excreted in the urine. The gonadotrophins rapidly reach a high concentration in the early weeks of pregnancy and then fall rapidly after the second month to a lower level for the remainder of the pregnancy. On injection of the hormone into infantile rodents three characteristic reactions are evoked: firstly, hyperæmia of the ovary (maximum at the end of twenty-four hours); secondly, follicle ripening (leading to follicle hæmorrhage) and induction of vaginal œstrus (maximum at the end of eighty-four hours); and thirdly, the formation of *corpora lutea* (maximum at the end of one hundred and twenty hours). These characteristic reactions are evoked to a varying extent by the different kinds of hormones: (i) with sheep pituitary, the amount necessary to induce vaginal œstrus or luteinization was ten to twenty times that necessary to induce the hyperæmic reaction; (ii) with blood gonadotrophins from a pregnant mare ten times the amount of hormone is needed to produce hyperæmia as to produce œstrus; (iii) with chorionic gonadotrophins from pregnancy urine hyperæmia is induced with the same amount as evokes œstrus, whereas three times this is required for luteinization. The hyperæmia effect on the ovary can be utilized therefore as a test for early pregnancy to give a result within twenty-four hours with a sensitivity rather greater than and of a specificity equal to that of the original pregnancy test based on the formation of *corpora lutea*.

The same fallacies will of course apply to the 24-hour test as to the original pregnancy test. Any condition which will cause an upset in the general hormonal balance with an excretion of gonadotrophic hormones may produce a positive result with the Aschheim-Zondek test. Titus (1945) gives the following list of conditions in which a positive result from the Aschheim-Zondek test can occur in the absence of pregnancy: (i) at the menopause; (ii) with certain endocrine disorders, especially of the pituitary, thyroid and adrenals, and with certain ovarian tumours; (iii) during hormonal therapy, such as the administration of substances of the anterior pituitary type. In other conditions, which Titus lists, as tubo-ovarian abscess, tuberculosis or malignant disease, a positive result is probably not due to the disease itself, but to some indirect effects. The common causes of false negative results are given as follows: (i) the performance of the test too early

in pregnancy; (ii) performance of the test prior to miscarriage of non-viable chorionic tissue; (iii) faulty collection of the urine sample; (iv) lack of sensitivity of the rat's ovary.

#### Summary.

1. A technique is described for the 24-hour hyperæmia test for early pregnancy and this is contrasted with that of the routine laboratory test.
2. In 100 cases the results of the hyperæmia test were found to give results of an accuracy which compared favourably with those of the routine test.
3. A brief account is given of the literature on the hyperæmia test.
4. Some of the principles are discussed on which the biological test for pregnancy is based.

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### THE EFFECT OF PENICILLIN ON CLEARANCE RATE IN DIPHThERITIC INFECTIONS.

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THE use of penicillin in diphtheria has received scant attention in the literature, probably because it soon became clear that penicillin could not replace antitoxin treatment, but in a report of a subcommittee of the Public Health Laboratory Service in Great Britain (1948) and in several other recent papers (Bixby, 1948; Long, 1947; Weinstein, 1947) accelerated clearance of *Corynebacterium diphtheriae* from the naso-pharynx is reported. An impression was forming at our hospital, perhaps because failures are remembered long after successes are forgotten, that penicillin gave disappointing results in the treatment of persistent carriers. For this reason we decided to review our experiences with penicillin in *Corynebacterium diphtheriae* infections, assessing results in terms of clearance rate.

The figures presented below were obtained from hospital records and refer to 118 patients consecutively admitted over an approximate six-month period, dating from the time a routine weekly swabbing procedure was instituted, plus 34 convalescent carriers treated with penicillin in the previous two months. Other cases, in this two-month period, were difficult to assess owing to lack of swabs in early convalescence—swabs being taken only when the patient's physical condition warranted early discharge

from hospital. The case material for review therefore comprises 152 patients, of whom 112 had clinical diphtheria and 40 subclinical diphtheria of the naso-pharyngeal region.

Penicillin was given parenterally in doses ranging from 100,000 to 500,000 units daily for five to nine days. Intervals between doses ranged from two to twelve hours. In the majority of instances 200,000 to 300,000 units, in two or three doses, were given daily for six days in all. Patients undergoing tonsillectomy, all of whom received a standard penicillin course at the time of operation, have been excluded from penicillin-treated groups.

All patients in this series, both those clinically affected and carriers, were given antitoxin. In acute cases the patients received 4000 to 120,000 units (average 19,000 units) and symptomless carriers received 2000 to 4000 units of diphtheria antitoxin.

Diagnostic and clearance swabs were taken separately from nose and throat. Diagnostic swabs were used to inoculate an inspissated serum (Löffler) slope and a tellurite plate. Clearance swabs were examined on tellurite media only. *Corynebacterium diphtheriae* strains were isolated and typed culturally and serologically, their virulence was determined and the cultures were vacuum dried for preservation. Virulent strains of *Corynebacterium diphtheriae* were isolated from all patients included in the present series.

Provided that a patient was physically fit, he was usually discharged from hospital after two successive negative results from examination of swabs taken at intervals of two or three days. For patients with clinical diphtheria who "cleared" early the follow-up was more searching, because such patients usually remained in hospital for several weeks even if they ceased to carry *Corynebacterium diphtheriae*. No patient of this type had less than three, while many had six or more, negative results from examination of convalescent swabs.

A classification of case material, showing clearance rate and the cultural types of *Corynebacterium diphtheriae* concerned, is given in the accompanying table (Table I). Rapid clearance in penicillin-treated patients signifies that the first of two or more successive swabs yielding negative results was obtained within three days of the termination of treatment. Rapid clearance in groups of patients who received no penicillin means that the first of the series of swabs with negative results was the first routine weekly swab—that is, clearance occurred at a time comparable to that associated with successful penicillin treatment.

Table I illustrates three main points.

1. Patients receiving penicillin "cleared" more rapidly than those who did not. Comparing the patients with clinical diphtheria in groups A and B the difference is highly significant ( $p = \text{less than } 0.001$ ). The difference between groups D and E, the symptomless carriers, is less significant, probably owing to the smallness of group E ( $p = 0.036$ ). Similar results are recorded in the report of the subcommittee of the Public Health Laboratory Service (1948) and by Bixby (1948).

2. In penicillin-treated groups there is no statistically significant difference in rates of clearance between those with acute infections on the one hand and symptomless or convalescent carriers on the other; for example, compare groups A and C ( $p = 0.143$ ). It has been found by others that the acute infection responds to penicillin better than the convalescent infection, and it is possible that a significant difference might appear in a much larger series.

3. Penicillin accelerated clearance about equally well in *gravis* and *mitis* infections; 39 or 54 *gravis* infections and 31 of 39 *mitis* infections responded to penicillin. *Intermedius* infections at this time were uncommon and therefore impossible to assess. English workers, according to the report of the subcommittee of the Public Health Laboratory Service (1948), have found that *mitis* strains are more sensitive to penicillin *in vitro* than *gravis* strains, but whether sensitivity varies with serological type has not been determined.

An analysis of patients who failed to "clear" rapidly provides some interesting facts. It was possible in three

TABLE I.  
Rate of Disappearance of *Corynebacterium Diphtheriae* from the Naso-pharynx.

Type of Patient.	Treatment.	Group.	Number of Patients in Group and Strain of Organism.	Number who "Cleared" Rapidly.
Patients admitted with clinical diphtheria.	Penicillin on admission.	A	40 { <i>gravis</i> . . . . . 22 <i>intermedius</i> . . . . . 3 <i>mitis</i> . . . . . 15	34 { <i>gravis</i> . . . . . 18 <i>intermedius</i> . . . . . 2 <i>mitis</i> . . . . . 14
	No penicillin treatment.	B	40 { <i>gravis</i> . . . . . 21 <i>intermedius</i> . . . . . 3 <i>mitis</i> . . . . . 16	9 { <i>gravis</i> . . . . . 2 <i>intermedius</i> . . . . . 2 <i>mitis</i> . . . . . 5
	Late penicillin for convalescent carriers. <sup>1</sup>	C	32 { <i>gravis</i> . . . . . 21 <i>intermedius</i> . . . . . 2 <i>mitis</i> . . . . . 9	23 { <i>gravis</i> . . . . . 13 <i>intermedius</i> . . . . . 2 <i>mitis</i> . . . . . 8
Patients admitted as symptomless carriers.	Treated with penicillin.	D	27 { <i>gravis</i> . . . . . 11 <i>intermedius</i> . . . . . 1 <i>mitis</i> . . . . . 15	18 { <i>gravis</i> . . . . . 8 <i>intermedius</i> . . . . . 1 <i>mitis</i> . . . . . 9
	No penicillin treatment.	E	13 { <i>gravis</i> . . . . . 11 <i>intermedius</i> . . . . . 0 <i>mitis</i> . . . . . 2	4 { <i>gravis</i> . . . . . 3 <i>intermedius</i> . . . . . 0 <i>mitis</i> . . . . . 1

<sup>1</sup> Average period in hospital before penicillin therapy started was 39 days.

instances to compare the penicillin sensitivity of the organisms isolated after an unsuccessful course of the drug with that of the organisms isolated before therapy commenced. No increased resistance to penicillin was detected.

The six failures amongst 40 acute infections treated with penicillin (group A) were made up as follows:

1. Examination of the swabs from one patient yielded one negative result shortly after penicillin administration, and two further negative results at weekly intervals; then twenty-three days after cessation of therapy a single colony of the same cultural and serological type as the primary infecting strain appeared on a tellurite plate. The results of examination of two subsequent swabs were negative.

2. One patient "cleared" without further treatment three weeks later.

3. One patient is still carrying *Corynebacterium diphtheriae* at the time that this paper is being written, sixty days after his penicillin course finished.

4. One patient continued to carry organisms for twelve weeks, and did not respond to two further courses of penicillin, but "cleared" after tonsillectomy.

5. Two patients yielded profuse growths of *Corynebacterium diphtheriae* of the same serological type as the primary infecting strain (*gravis* type II), sixteen and twenty-four days respectively after penicillin treatment ceased, whereas the results of examination of intervening swabs had been negative. In each instance the reappearance of *Corynebacterium diphtheriae* was associated with a clinical incident—in one patient a fresh sore throat, in the other a "cold" with rhinorrhoea, both pyrexial. It is possible that reinfections rather than relapses may have occurred in both these patients, since there was an ambulant *gravis* type II carrier in the ward at the time their swabs again yielded organisms. One patient was immediately and successfully treated with penicillin, while the other patient's infection cleared up within three weeks without further treatment.

The subsequent history of the nine patients in whom failure occurred amongst 32 convalescent carriers treated with penicillin (group C) was as follows:

1. In one patient a single *Corynebacterium diphtheriae* colony on tellurite intervened between four post-penicillin swabs yielding no organisms.

2. The remaining eight patients continued to act as carriers for periods varying from two weeks to eighteen weeks. Four patients received a further course of penicillin, which was successful in one instance only.

The nine patients in whom failure occurred amongst 27 symptomless carriers treated with penicillin (group D) carried virulent *Corynebacterium diphtheriae* for further periods varying from three weeks to twelve weeks. Four

of these patients had another course of penicillin, which again proved unsuccessful.

Amongst groups not receiving penicillin (B and E) those patients who did not "clear" rapidly took an average of thirty-one and twenty-nine days respectively until the first of their final swabs whose examination yielded negative results. One child took seventy-four days to "clear", but most patients in the series under review were given penicillin long before this time and thus fall into group C of Table I.

#### Discussion.

Rapid clearance of *Corynebacterium diphtheriae* not only shortens the period of stay in hospital for patients with mild infections and for convalescent carriers, but also tends to minimize the risks of cross infection in diphtheria wards. It has been routine practice in this hospital for several years to administer penicillin to any patient with severe diphtheritic infection, such as laryngeal diphtheria and "bull-neck" diphtheria, but only in recent months has penicillin been prescribed at all frequently for milder infections. Cross infection with different serological types of *Corynebacterium diphtheriae* was not an infrequent occurrence during the early months of the period under review. Patients suffered no apparent harm, but the period of stay in hospital was increased. In recent months cross infection has been greatly reduced, and it seems likely that penicillin treatment in the acute case, by minimizing the multiple sources of infection, has been a major factor in such reduction.

Penicillin has an interesting side-effect upon the agglutinin response in diphtheria. Investigations at this hospital, at present unpublished, show that type specific agglutinins are developed in almost all *Corynebacterium diphtheriae* infections which are not treated with penicillin at their outset. In patients who receive penicillin early in their illness the agglutinin response is significantly poorer and a high proportion of patients do not develop agglutinins. The influence of penicillin upon the development of active antitoxic immunity is under investigation at the present time.

It would appear, from the present series of cases, that once penicillin in apparently adequate dosage has failed to clear *Corynebacterium diphtheriae* from the nasopharynx, the chances that a second course will be successful are much reduced. Only two of ten patients who received further courses of penicillin for a persistent carrier state were successfully treated. The development of drug-resistant strains does not appear to be the explanation.

#### Summary.

1. Parenteral penicillin treatment accelerates clearance of the specific organism from body surfaces in *Corynebacterium diphtheriae* infections.



2. In this series there is no significant differences in clearance rates, in response to penicillin, between patients with acute infections and convalescents, or between those with *gravis* and *mitis* infections.

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### SOME PROBLEMS ASSOCIATED WITH THE MANAGEMENT OF CARCINOMA OF THE BREAST.

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THE management of carcinoma of the breast presents many problems in the matter of diagnosis, treatment and prognosis, as well as in the handling of the unfortunate patient who is not cured but who is the victim of metastatic deposits. It is because one has been struck with the frequency of such difficulties that this paper has been written.

#### Problems at the Diagnostic Stage.

Diagnosis is not always easy. First of all, carcinoma may occur in the breast which is the site of lobular hyperplasia. Sometimes cysts occur in a mass of dense tissue, and it is not always easy to rule out the presence of a malignant tumour in such cases. It may be possible to gain further information by fixing the tumour against a rib or by needling, but in many cases such a cyst, buried in a mass of tissue, in a breast the site of lobular hyperplasia, constitutes a "tumour of uncertain nature". Never think that because we see so many breasts which are the site of bilateral lobular hyperplasia, and in which no question of malignancy arises, that carcinoma does not occur in such breasts. Unfortunately it does.

What should one do when confronted with a patient with a tumour of uncertain nature in the breast? No patient should be allowed to keep a tumour whose exact nature is at all uncertain. The correct procedure is to inform the patient that a reasonable doubt exists as to the nature of the tumour, and owing to the high risk associated with delay in the treatment of carcinoma of the breast, the tumour should be removed under general anaesthesia. Permission should be secured to remove the breast should the tumour be malignant. The tumour is generously excised and examined by the surgeon macroscopically. In the majority of cases the surgical pathologist (which every operating surgeon should be) can tell if the lesion is innocent or malignant. If a frozen section can be prepared by a pathologist accustomed to the examination of such sections and working under good conditions, advantage should be taken of his help. If one is still in doubt two courses are open. One may close the wound and await the usual paraffin section, or one can proceed with the radical operation.

In rare instances two separate malignant lesions may occur in the one breast, and later a malignant lesion may appear in the contralateral breast. This may be a secondary manifestation or an entirely new lesion. Recently a patient was examined who had carcinoma of the breast seventeen years after the removal of the other breast for a malignant growth.

Never forget a chancre of the nipple when confronted with an ulcerated lesion. The primary specific lesion is often destructive and may give rise to considerable uncertainty.

#### Problems in Relation to Treatment.

The acute carcinoma of the breast of pregnant or lactating young women is a vicious disease which may kill the patient in two or three months. I have very considerable doubt whether such women should be subjected to radical amputation of the breast, as the prognosis is so bad. Treatment by irradiation alone is possibly preferable, because local recurrence in the chest wall is frequent and amputation does not necessarily avoid local fungation. One patient upon whom I performed amputation of the breast for an acute carcinoma of lactation had congenital absence of the *pectoralis major* and *pectoralis minor* muscles of the affected side. Within a few weeks the entire side of the chest wall was the site of mushroom secondary deposits. Nodules would spring up almost overnight and in a short interval ulceration occurred.

In my opinion consideration should be given to termination of pregnancy if carcinoma occurs during the early months. The position is different late in pregnancy. The prognosis for the mother is so bad in any case that all consideration should be given to the viability of the child, and obstetric aid should be sought to terminate the pregnancy at the earliest opportune moment for the child.

What should be the treatment of the old, frail woman with a slowly-growing scirrhus carcinoma of the breast? Without doubt many of these lesions have a low grade of malignancy, and patients are seen who have lesions of very long standing. Although radical amputation can be successfully performed on frail people, even with the use of local anaesthesia, I think the best way to handle the condition is to perform a simple mastectomy under "Pentothal" anaesthesia and follow this with irradiation therapy when the wound has healed. The same treatment should be given to patients with advanced medical disease. The prognosis in many chronic medical diseases is so uncertain that I think an active attitude should be taken towards a concomitant breast lesion. Although I think that for the most part carcinoma of the breast in the aged should be treated, individual surgical judgement may indicate that the breast lesion should be left untouched.

Fungation or near fungation of a carcinoma of the breast is in itself no bar to surgical attack. Great care should be used in regard to irradiation in these cases, as extensive sloughing may occur when radium is used in infected ulcerated breasts. Infection of the chest wall and arm is very apt to follow operation for a fungating lesion, and prophylactic chemotherapy is strongly advised, as the sepsis may not remain localized but may become general.

Women in the child-bearing age who have been treated by standard operation with or without operative irradiation present several problems. The prognosis for these women may be affected by the occurrence of pregnancy, and there is definite opinion that these women should be sterilized, preferably by surgical removal of the ovaries. Sterilization by irradiation is satisfactory. We have had several women who have become pregnant shortly after operation. These women present a difficult problem as regards the advisability of allowing the pregnancy to continue. Small secondary deposits advance rapidly during pregnancy, and by term the unfortunate patient is often the victim of diffuse carcinomatosis and requires delivery by Caesarean section. Death is not long delayed.

Occasionally one sees a residual tumour of the breast in a patient previously treated by irradiation. The presence of this tumour causes anxiety to the patient and to the doctor. Usually radium has been used because there was some contraindication to surgery, and if removal seems advisable simple mastectomy is the usual procedure. New tumours composed of fibrous tissue will be seen to arise in the breast for a period of up to two years after radium treatment, and the appearance of

these new tumours causes disquiet. Simple mastectomy should be performed in these cases.

Radical amputation of the breast should be performed in cases of Paget's disease of the nipple. A more difficult problem is presented when a patient over forty years of age presents a breast with recent nipple retraction and no definite palpable tumour. Grave suspicion of a subareolar scirrhous carcinoma must exist, and radical amputation is justifiable if this nipple retraction is definite, rigid and progressive.

What should one advise when a patient presents with a blood-stained discharge from the nipple? Even if no definite tumour is palpable, simple mastectomy should be advised if the patient is in the cancer age. A duct papilloma in a young woman may give rise to a blood-stained discharge. If the nodule can be felt it can be treated conservatively by an operation designed to remove the affected duct and lobule, and the result is usually safe and satisfactory. Clear discharge from the nipple may be bilateral and usually means the presence of diffuse lobular hyperplasia.

The male breast is infrequently the site of carcinoma. The common tumour of the male breast is the mass of tissue beneath the nipple, the result of chronic mastitis. Carcinoma of the male breast occurs in a frequency of approximately one to every 100 cases of carcinoma of the female breast. Diagnosis is too often unduly delayed because the male patient is not so aware of the possibility of carcinoma of the breast as is the female patient. In addition the prognosis is affected by the fact that in the small male breast the lesion lies right against the chest wall and lymphatic spread occurs more easily. Treatment is the same as for the female, but skin removal must be adequate and not influenced by consideration of ease of closure. Skin grafting should be required in most cases.

#### Operative Problems.

One is sometimes in doubt as to operability of a breast lesion. May I be permitted to detail the definite obstacles to reasonable operative attack upon a carcinoma of the breast? They are as follows: (i) fixation to and therefore involvement of the thoracic wall; (ii) fixation to the axillary artery; (iii) the presence of visceral metastases; (iv) the presence of bony metastatic lesions; (v) involvement and fixation of supraclavicular lymph glands; (vi) extensive skin and subcutaneous involvement leading to a condition of *cancer en cuirasse*.

As was mentioned previously, in certain cases operation is not the treatment of choice for acute carcinoma of the breast in young women, for atrophic scirrhous carcinoma of the aged and for carcinoma of the breast in people seriously ill with other disease.

The small growth in the periphery of the breast gives rise to a minor operative problem in relation to skin excision. The skin removal must include the nipple and a wide area of skin over the primary lesion. No consideration must be given to ease of subsequent closure or to cosmetic result in the planning of the skin incision. In the case of operations on thin women with small breasts and on the male, primary skin grafting should be required often. Immediate skin grafts take well as a rule, but the skin grafting may be done as a secondary procedure in order to cover properly prepared granulating areas.

Drainage of the axilla is always worth while, because even the most careful pressure dressings are not capable of preventing collections of serum in the space just below the clavicle.

Sloughing of portions of the skin flaps sometimes occurs and greatly delays ultimate healing and favours secondary infective processes, and if post-operative irradiation is used this is unduly delayed. Sloughing is favoured if wide flaps are cut early in the operation, if the deep surface of the flap is scored by unskilled reflection at varying depths, if reflected flaps are subjected to undue trauma or chilling and if the skin edges are pulled together under tension.

The collection of serum in the wound is undoubtedly lessened by careful application by the surgeon himself of

an efficient pressure dressing. Attention has been drawn to this point by recent writers and teachers, and thorough attention to the particular method of application of pressure certainly obviates a most troublesome post-operative problem.

The involvement of the axillary vein may cause some concern. This vessel can be resected safely. Injury to the vein is a serious accident if it is not recognized. Fatal air embolism can occur easily when a small injury to the vein occurs and is not recognized. Air embolism is more likely in axillary dissections than in operations on the neck.

Primary lesions in the lower and medial quadrant of the breast call for adequate fascial removal from the upper portion of the abdominal wall. Lesions in the medial half of the breast are more likely to give rise to secondary lymphatic extension to the anterior mediastinal nodes. (Sampson Handley recommended the implantation of radium needles in the intercostal spaces at the time of operation to attempt to deal with this method of spread, which is certainly not circumvented by the radical amputation.)

#### Problems Associated with Prognosis.

One of the most difficult things to learn in medicine is the life history of disease processes, and, of course, the giving of a reasonable prognosis depends upon such knowledge. The expectancy of life in an untreated case of carcinoma of the breast varies considerably, and depends upon the stage of growth, the age of the patient, histological classification of the tumour, size and position of the tumour, the physiological state of the breast and duration of the disease. The outlook also depends on the unknown fact of the natural resistance of the patient to the invasive powers of the growth. Spontaneous regression of a growth has been fairly adequately established. In an acute carcinoma of the breast the patient may expect to live only a few months whether treated or untreated. An atrophic scirrhous carcinoma of the breast may not cause death, even though it has been present for ten to twenty years. The average length of life of the untreated patient suffering from carcinoma of the breast is probably between two and four years. Although we are familiar with many figures published to show varying percentages of five-year cures, it is not possible to be certain that a patient is free from the possibility of metastases even many years after operation. I have seen a patient present with bony metastases fifteen years after operation. Recently I examined a patient upon whom I had operated early in 1940 for a scirrhous carcinoma of the breast. She had been perfectly well until backache in 1948 heralded the presence of extensive bony metastases.

As I have outlined above, prognosis depends on a number of factors, but chiefly upon the stage of the disease. The stage of the disease is to be distinguished from duration of the disease. When the only manifestation of the disease is a tumour of the breast (Stage I) the prognosis is usually good. Gordon-Taylor published a figure of 86% five-year survival rate for this group of patients. If axillary glands are involved there is a radical change in the picture, and for general clinical appraisal of the individual outlook the involvement of the axillary lymph nodes is of the greatest importance. Truscott in 1947 collected figures from the Middlesex Hospital, and found 64% of five-year survivals in Stage I but only 31% of five-year survivals in Stage II. The pronounced drop in the survival rate of patients with Stage II carcinoma of the breast is an almost universal finding.

Involvement of the skin places a carcinoma of the breast in Stage II of the disease. Involvement of the skin and even fungation are not a bar to reasonable operation, but extensive involvement of the skin with oedema leading to a *peau d'orange* effect is a grave prognostic sign. The appearance of discrete skin nodules at a distance is the very gravest sign.

The treatment of choice for carcinoma of the breast, in Stage I at least, is radical amputation, and the patient

may wish to know, and the surgeon should know, the immediate risk to life from the operation. Sir Stanford Cade analysed the mortality rates from all the London teaching hospitals, and of 11,014 patients subjected to this operation 182 patients died (1.65%). The mortality rate from the operation is universally low.

#### The Question of Irradiation.

The use of irradiation in the management of malignant disease of the breast varies in different clinics and hospitals throughout the world.

In Stage I of the disease radical amputation of the breast is a complete and adequate operation anatomically, except for two factors. When a carcinoma is situated in the medial quadrants of the breast there may be involvement of the anterior mediastinal nodes before the axillary nodes are involved. When a carcinoma of the breast is situated in the upper and outer quadrant, it is possible for cancer cells to pass directly to the supraclavicular glands while there is no clinico-pathological evidence of axillary node involvement. It is because of these two possibilities and because the skin excision is not so extensive as the deeper dissection in this operation that properly administered post-operative irradiation may be justifiable. Post-operative irradiation deals with possible extension of the disease beyond the area of operation to sites inaccessible, but possibly involved, by reason of anatomical structure. To sum up on this point, we may say that irradiation is a doubtful measure, and, although we may not feel like denying it to the patient, the results do not appear to be improved by its employment.

The greatest uncertainty concerning the use of irradiation exists in relation to the treatment of Stage II carcinoma of the breast. If a carcinoma is in Stage II because of axillary gland involvement only, I think post-operative irradiation should follow radical amputation of the breast. Careful consideration should be given to patients with extensive skin involvement. It may be possible that in these cases it is wiser to use post-operative irradiation. The principle of the radical operation is to be entirely clear of the furthest limits of the carcinomatous invasion. When there is extensive skin involvement I think this principle may be infringed, with the result that rapid and extensive chest wall metastases arise. There is available, from radio-therapeutic sources, evidence that results may be improved in Stage II lesions with extensive skin involvement by the use of pre-operative irradiation.

Irradiation therapy is the best treatment of carcinoma in Stage III.

Palliative irradiation therapy is of value in the treatment of skin, gland and bone metastases. Although experience with male hormone administration is limited, this treatment of secondary manifestations in bone is of some value. Large dosage is required and at present the treatment is not of much practical value. The artificial production of the menopause in pre-menopausal women with bone metastases is often of value.

#### Conclusion.

Carcinoma of the breast is a dread disease. Women are becoming more aware of the possibility of the occurrence of carcinoma of the breast. With better education on the subject more women are reporting abnormalities of the breast, including the "lump" of malignant disease. The breast is a normal breast, a breast the site of obvious malignant disease, or a breast containing a tumour about which there is reasonable doubt. This doubt should be resolved. Neither precipitate an unnecessary anxiety state in the patient nor forget that when a carcinoma passes from Stage I to Stage II the chance of the patient's surviving for five years is reduced to much less than one half. I have attempted to deal with some of the problems associated with the management of carcinoma of the breast, and it will be realized that most of these problems are non-existent when the surgeon is called upon to treat a carcinoma confined to the breast itself.

### ARMY CATERING, THE FUNDAMENTAL BASIS OF NATIONAL WARTIME STRATEGY AND FIGHTING EFFICIENCY.<sup>1</sup>

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THE feeding of the soldier from ancient times has depended chiefly upon foraging in the enemy's country, the baggage train being as small as possible. With the growth of large modern armies the problem of supply assumed its modern form. In the conscript army of Germany resulting from the Napoleonic wars, scientific principles were first applied. The classical work of Rübner and Voit needs but to be mentioned in this respect, except that we should remind ourselves that then as now it was assumed that knowledge of nutrition was complete. Then, Calories, protein, carbohydrate and fat were the essential factors to be considered. Today, we are just as confident concerning some knowledge of some vitamins.

The Spanish-American War and the Boer War respectively influenced the armies of the United States of America and the United Kingdom, leading to the formation of a Supply Corps on the one hand and the Army Service Corps on the other. The whole question involved in this development is extremely complex, and relates not only to the technique of supply in the field, but also to the matter of army contracts, and all that is encompassed by the term.

For our purpose it is necessary but to mention the historical development of a highly organized service of supply to armies in the field at the date mentioned to show how recent it is.

Our subject begins with the field trials conducted in Britain in the years 1909 and 1910, under supervision of Professor J. S. Haldane, F.R.S., of Oxford, and the subject of a report to the Army Council by the Medical Advisory Committee to the War Office. This report, and the careful work upon which it was based, are notable for two reasons—first, because it demonstrates, contrary to the generally accepted notion, that there were people in authority in England who had both the foresight and the sense of responsibility to make accurate assessments and proposals. This is in stark contrast with the completely irresponsible and almost criminal levity with which the Liberal statesmen of the period permitted war to be adopted as a political conclusion, without having taken the least of essential steps to ensure that war could be waged efficiently. Secondly, the report is the more remarkable for the fact that its findings were, in the actual event of war, ignored.

During the 1909 trials, the men of the Loyal North Lancashires were found to expend 4034 Calories, which on the Army daily ration of 3119 Calories left a deficit of 914, which was bridged by utilization of their own body tissues. There was loss of weight and excessive fatigue, and the weight lost was found to correspond with that calculated as necessary to supply 915 Calories daily.

In 1910 the trials were repeated with men of the Somerset Light Infantry, and the ration was raised to 4119 Calories by increasing the fat by 50% and the carbohydrate by 20%. The men remained fit and well, were not fatigued by the exercise, and even slightly gained weight.

Contrast these findings with the state of affairs reached by 1918 when circumstances compelled the use of a ration providing 3432 Calories for adult soldiers and 3242 Calories for adolescent recruit trainees as minimal values unless, so the recommendation ran, "the demands of training could be further reduced". Here we are faced with the actual restriction of the soldier's physical effort by the expediency of the occasion. I would rather describe it in these words than say the necessity of rationing, for the whole situation was one to which no really responsible thought had been given by the Government either prior to the war or, from the standpoint of science, during it. Suffice it to emphasize the fact that the fighting man himself was being given an increasingly heavy burden of energy demand, and at the same time was being underfed. It should be mentioned that the sixpence a day extra allowance was expected to provide most, if not all, of the deficit, but this assumed both the availability of the essential foods and the intelligence to select them from a

<sup>1</sup> Read at a meeting of the Section of Naval, Military and Air Force Medicine and Surgery, Australasian Medical Congress (British Medical Association), Sixth Session, Perth, August, 1948.



nutritional standpoint. If this argument is insufficient to prevent subsequent canteen services from supplying food items, the stress of total war on manpower will. Only an unrealistic attitude to modern war could lead to the confused situation that existed within the Australian army in this respect in 1939 to 1945.

The first World War, so far as its influence upon the armies of the United Kingdom and the United States of America in this connexion is concerned, may be summed up by saying that in the United Kingdom the exigencies of submarine blockade directed attention to food conservation by elimination of waste, and in the United States attention was directed more towards the application of the newer principles of nutrition by closer attention to the vitamin content of foodstuffs procured. In the United Kingdom the closing years of the war were so overcast by the food shortage that the catering trades were appealed to for advice upon catering management in the vast camps throughout the kingdom. In the United States of America, with food in plenty, the medical advisers to the Quartermaster Corps started the work which was to lead after the war to the establishment of the Subsistence Laboratory at Chicago.

The post-war British army retained its honorary catering advisers and concentrated upon the better training of the army cook. In the United States of America the Quartermaster Corps, through its Subsistence Laboratory and through the unique experience of its depot quartermasters working in close liaison with remarkably efficient Federal departments, such as the Department of Agriculture, the Federal Bureau of Chemistry and the Federal Trade Commission, developed the application of science to food procurement and to subsistence in all its aspects to a very high degree of efficiency.

The Australian army, though based upon the British army in principle and plan, was, so far as feeding is concerned, subject to the unique influence of its history and geography. It had always fought in imperial wars thousands of miles from its homeland, and the latter was, within limits, a land of plentiful food supply. Feeding in training camps, therefore, was temporary, unreal and, in the mind of officers and men, unrelated to what they would be prepared to find on service. They left Australia inadequately trained as to unit feeding, and hopelessly spoiled by the generous extra feeding provided by citizen and religious organizations, which acted on the assumption that the soldier was almost necessarily underfed.

The direct assault upon Australia by the Japanese disclosed the folly of this excessive and wasteful drain upon the nation's food resources.

#### Problems of Feeding in Mass.

Let us consider the problem of feeding large numbers and contrast that of civil and of army feeding, for today we can no longer think of war as an affair of soldiery conducted in some sort of "theatre of war". War today is total. The problem of food supply and usage is both a civil and a military one.

The Commonwealth Nutrition Survey of 1935 to 1938 disclosed an average energy intake of 3400 Calories for the working adult male. This is an "average" value. Individuals of the same age group doing similar work show a wide range of variation in performance about which little is known. In a study of ten men, aged twenty-two to twenty-five years, belonging to a works and parks company and engaged upon the same tasks, I found a variation from 3320 to 3888 Calories per man per day. This compares very favourably with results quoted by Sir Jack Drummond for workers in the age group twenty-nine to thirty-five years, who required 2740 to 3420 Calories per man per day. Influences both physical and psychological operate to cause this difference between individuals.

In the determination of the food requirement for a group of workers in a population, variations of this magnitude when multiplied by millions have an enormous influence upon strategy from the standpoint of shipping alone. A difference of 200 Calories per day in computing the average needs of 3.8 million adolescents meant 90,000 tons of wheat per year—a serious shipping problem for Britain at war. There is need for a careful investigation of the range of variation of calorific requirements of the individual. It would be a tedious and troublesome study, but would provide information of great national value.

There are many other sources of error in computing foodstuff requirements for populations, ranging from the choice of available conversion factors to be used in converting weights of given material into Calories, to the question as to whether the ration for coal miners is to be assessed on the energy requirement of a

man working at the coal face, or on an average including that of the much smaller output of a winchman.

In an army these same problems arise, but the approach is different. The essential difference is that the soldier's feeding is regimented, and calls for the most scrupulous attention to his intake of accessory food factors because he, unlike the civilian, has no range of selection. On the other hand, like those of the miner, the energy requirements vary, from those of the orderly room staff to those of men doing full-pack field exercises. How is the soldier's ration to be calculated? Is it to be determined on the basis of maximum requirements or of average needs? The British (and the Australian) army supply system operates upon the basis of a ration indent submitted by the unit quartermaster, which theoretically provides for deletion of unrequired items. The United States army unit indents on a parade state basis, and does not concern itself with surplus or waste—at least that was the practice during the war in the South-West Pacific Area. When food wastage reached alarming proportions in 1942, the response of the Commonwealth authorities was to authorize inspection of quartermaster stores by officials of the finance branch. In other words, control of the soldiers' feeding was to be applied through accountancy. The natural outcome of this approach to army feeding is the proposal to reduce the ration and to seek some formula for an average daily energy requirement. The result was a confusion of ration scales, A, B, C *et cetera*, more work for supply services, and no solution.

My reaction to this was, and still is, that this is not only unscientific but dangerous from a nutritional standpoint, and therefore demands the closest attention of the general staff and the medical corps. The adequate feeding of the soldier demands that a full cover for all nutritional requirements be made available, and that being made available this is in fact given to him in a form and manner such that these requirements are fully met. If the ration is to be limited by arbitrary financial considerations it becomes impossible to ensure that these nutritional requirements will be available, or that the management of the soldiers' messing can produce variety and full utilization.

It is my opinion that the maximum ration should be available, but since the number of soldiers in a unit requiring it will be in a minority and there will be several intermediate grades of requirement, it is for efficient catering management to determine what the total food indent shall be. The unit caterer acts, in other words, like the manager of a restaurant and advises the quartermaster on the compilation of the ration indent. In this manner expert adjustment of ration use to feeding requirement can be made, and, provided that the cooks and caterers are both technically well trained and competent, nutritional principles can be applied in practice to achieve the best results in human bodily health and efficiency.

For success it is obvious that two important factors must be clearly appreciated and thoroughly dealt with. These are (i) the scientific compilation of the commodity list and control of the standard of quality of the items to ensure their full content of essential nutrients under the conditions of preparation, supply and storage compelled by the necessities of war, and (ii) the adequate training of cooking and catering personnel. To these should be added the need for all ranks and all arms of the services to realize the technical military significance of the soldier's ration, its mode of supply and its preparation for use.

#### Army Rations, Design, Supply and Use.

Manifestly then, the energy content of the ration must be a major consideration. Reasons have been given for the assessment of this on the basis of maximum demands of fighting troops.

Items of the ration should be as limited in number as is compatible with ability to prepare palatable meals conveying all essential nutrients. It should be the aim of the general staff to reduce the commodity list for strategical and tactical reasons to comply with this desideratum. This can be done only with full cooperation of all ranks, as the result of intensive education, by bringing army cooking and catering to the highest pitch of efficiency, and by the closest cooperation of the medical services. From the supply service standpoint alone, the lessened strain upon manpower and facilities would be invaluable, but national strategy and army tactics would benefit to a vital extent.

The number of items being reduced, it requires greater skill to prepare palatable meals and to introduce variety. Waste must of course be reduced to vanishing point by application of the same skill. To mention some basic items only, it will be obvious that, if butter is to be supplied, it must take a form

similar to that developed by the dairy division of the Council for Scientific and Industrial Research for the army in the Pacific war, namely, it must not go rancid on storage or become too fluid under hot conditions. All ranks must, however, be trained to accept what is, after all, the highest grade purified butter fat, the removal of the water alone reducing weight by 18%.

Cereal foods, being the only reliable and considerable source of the vitamin B complex as well as a valuable source of minerals, including iron and calcium, must receive closer attention from the standpoint of production and supply, and with this is closely connected the making of army bread. From experience of the war in the Pacific, it is evident that unless we can find a military (which is a scientific) solution of the supply of cereal and bread as major foodstuffs, we face both material and manpower wastage, which is repugnant to acceptance of national total war responsibility. In the recent war the attempt was made to restore to the white flour the vitamin B complex *et cetera* in the form of wheat germ in which the oxidases had been destroyed by heating *in vacuo*. The full advantage of this procedure was lost owing to low gluten content of flour, further weakened by storage in tropical conditions, so that more often than not the baker could not add the germ without causing his bread to go "flat". This raises the question as to whether wheat should be supplied, for use in breadmaking or for cereal, by mobile gristing mills at brigade headquarters. It also raises the question of purchase of wheat on the basis of gluten content and not in terms of f.a.q. export standard.

A little consideration will disclose the enormous advantage of such a procedure, both from the supply and from the feeding standpoint. It may be remarked here that there is as great a difference between freshly gristed grain and stored cereal as there is between freshly ground coffee and its opposite variety, so far as flavour and appetizing appeal are concerned.

Dehydrated vegetables must be given even more study than the intensive work in the recent war entailed. Even then means had been devised for retaining protective food value, and for reducing bulk of the dehydrated mass one hundredfold. The use of germinated field peas for antiscorbutic purposes could well form part of army training routine. Researches conducted by the Animal Nutrition Division of the Council for Scientific and Industrial Research, and by the Physiology Department of the University of Adelaide, laid the basis for conservation of accessory food factors in the army ration. A 50% nutritional casualty rate in the North-West Observation Force was reduced to zero by the use of gristed wheat and germinated peas.

Meat requirement is determined by catering needs, for it is impossible to prepare meals, as we understand the term, on less than 25 grammes (or, say, one ounce) of animal protein per man per day. That in turn represents somewhat less than half a pound of carcass meat. Marston, in his work for the Australian army, showed that approximately 15% of beef or mutton carcass consists of edible portion. This fact raises the question of boning and rolling meat so far as possible, for supply in chilled form, with the object of reducing transport and holding space. Large scale demonstration by Colonel Milner of the success of this method was made in supplying coastal defence units in the Newcastle area, from Aberdeen in the Hunter River valley, in 1942.

The use of dried milk and egg can be greatly increased by proper packaging and storage. The former should be in small units and the latter cool. Nevertheless, intensive research into the problem of protein denaturation should lead to valuable results in technical improvement of these products.

It is sufficient only to indicate the nature and complexity of this problem, and we pass therefore to such other essential aspects of the soldiers' feeding as its organization and technical conduct.

For obvious reasons feeding is, and must remain, a unit responsibility, within the control of the unit commander. The cooking gear must be suited to the task and to the situation, that is, whether stationary, mobile, or in subunits, for landing craft, or for jungle patrol. Only proper appreciation of the tactical significance of troop feeding by the general staff can lead ultimately to such essential provision as transport for cooks' gear in a landing operation. There arises, too, the question of the equipment table. The recent war showed the inadequate nature of this, and led to modification of the equipment table by provision of ordnance pools of cooks' equipment, from which commanders could indent what was suited to their particular tactical situation.

With this is closely related the type or types of fuel. It is my considered opinion that adaptability is essential, otherwise feeding will be jeopardized by being made contingent upon supply of a single substance. Cooking apparatus must provide for various types of fuel, especially such apparatus as cooks for small numbers, including company strength. Subject to the meeting of other requirements, efficiency in fuel use is very important. This again affects the load upon the supply services and is an important aspect of the soldiers' feeding. Finally, simplicity of design and reduction of weight are factors in tactical calculations, the significance of which is self-evident.

#### The Army Cook.

When all these and many other details, some barely disclosed, are given due consideration, we come to the man without whom none of the foregoing essentials can be put to practical use.

Instead of, as in the past, this human factor being left to the influence of indifferent selection and training, low military evaluation and absence of incentive or reward by way of promotion, the army cook must be made the essential feature of scientific feeding and efficiency in food utilization. The supply services have already raised their efficiency to a high level. It is largely frustrated if the cook is not a skilled, resourceful and intelligent technician.

Whilst he must, for fundamental reasons, remain a part of the unit to which he belongs, it is necessary to provide an organization to enable him to advance by promotion to commissioned rank. This cannot be done within the unit. The Army Catering Corps provides the means, and either by the initial action of the unit commander or with his cooperation on advice from the regimental caterer, a cook can be cross-posted to vacancies for higher rank, or promoted as far as the rank of sergeant in his own unit, if the vacancy exists.

The Catering Corps is thus an organization unlike any other in the army. It consists of unit personnel and functions on behalf of commanding officers to secure the best troop feeding possible. Casualties are replaced, kitchen strength is maintained under all conditions, and the regimental caterer supervises the cooks and the production of variety in meals, and the indent of rations to that end. He reports directly to the second-in-command, and thus ensures the most effective liaison between unit tactics and unit feeding efficiency. From the unit in the field all information upon the usefulness of the ration in practice, or the effectiveness of cooking apparatus *et cetera*, comes back immediately and directly through Catering Corps channels to the directorate of catering, which, by close liaison with supply services and with ordnance services, can rapidly effect change and necessary adjustment. Similarly, there is the same direct channel for all technical information distributed from headquarters.

Even in the field, this liaison function of the Catering Corps is second only in importance to the feeding of troops. The regimental caterer can greatly expedite matters requiring the aid of the engineer services, ordnance services and supply services, by direct personal contact. Without this, the "paper war" multiplies and the delays increase. In the feeding of troops, manifestly, delays cannot be permitted if efficiency is the aim, and efficiency means health and morale of troops, and less loading of the pipeline of supply. This is, therefore, an important function of the Catering Corps.

In a paper such as this, it is obvious that only the main principles can be outlined. Some few details have been given by way of illustration, but the subject is vast and its ramifications and interrelations are even greater. The object of the paper has been to show that the maintenance of an army in health and fighting efficiency depends upon the proper feeding of its officers and men, and that though every theoretical aspect of this problem may have been allowed for, including the most recondite nutritional and hygienic aspects of the matter, there remains the key to the whole situation—the army cook and caterer.

If army catering is functioning at a high level of efficiency, the strain of the food maintenance of the troops is reduced, the national effort is rendered more effective, and the nation's staying power is increased.

Efficient utilization of food in the army must in a crisis also influence the use of food by the civil population, and atom bomb or no atom bomb, war will still produce human resistance, and resistance leads to a confutation of the notion which lurks in the minds of those contemplating warlike solution of political problems, the notion that the sudden, unexpected blow will crush all resistance. Thus, time marches on, and failure of

food supply comes nearer, and, as in the case of the recent war, it is the final arbiter.

Army catering holds the key to national fighting efficiency, and the nation that places this consideration first, other things being equal, must always win.

#### Epilogue.

I should like to pay a tribute to Captain Plimmer and Captain Orr, who were given the impossible task of retrieving what politicians had already lost, the food situation in World War I. They are better known as the famous nutrition experts they became, Professor Plimmer and Lord Boyd Orr.

To two others I would pay a tribute, for without their ready acceptance of my views no economics could have been effected, no nutritional principles could have been applied, and no Catering Corps would ever have been born. They are Major-General Kenneth Smart, Quartermaster-General at the outbreak of war, and Colonel, later Major-General, Roy Burston, who at the same time was Assistant Director of Medical Services of the Fourth Military District.

### Reports of Cases.

#### CURE OF SUBACUTE BACTERIAL ENDOCARDITIS DURING PREGNANCY: REPORT OF A CASE.

By WILLIAM D. CUNNINGHAM and KEMPSON MADDOX,  
*Sydney.*

DURING pregnancy the development of subacute bacterial endocarditis is regarded as a rarity. In the past, before the introduction of antibiotics, subacute bacterial endocarditis was almost invariably a fatal disease.

At the Boston Lying-In Hospital seven such patients were recognized among 781 sufferers from rheumatic heart disease over a period of approximately twenty-two years (Hamilton, 1947). All of these patients died, three of them before the pregnancy and puerperium were complete.

It is our intention to describe a case in which, as a result of penicillin treatment, the outcome was more fortunate.

#### Clinical Record.

Mrs. P., aged twenty-two years, was admitted to King George V Hospital on July 17, 1948, in the twenty-seventh week of her second pregnancy. She complained of lassitude, anorexia, night sweats and joint pains, which had been present for five weeks, following upon the extraction of a single tooth. She had been regarded as suffering from rheumatic fever, but had not responded to salicylates or sulphonamide therapy. A week prior to her admission to hospital petechial spots had appeared upon the abdomen. Inquiry into her past health revealed that she had known herself to possess a damaged heart valve, as a result of two attacks of rheumatic fever at the ages of five and six and a half years. Her first pregnancy, a year before, had been uneventful.

Physical examination revealed a pale, thin, asthenic young woman in no distress. She failed to exhibit clubbing of her fingers, but a typical Osler's node was discovered in the palm of one hand and there was a history suggesting previous similar lesions. A few small petechiae were visible on her abdomen. Her pulse was regular at a rate of 102 per minute. Blood pressure was estimated at 120 millimetres of mercury (systolic) and 70 millimetres (diastolic). A diffuse and rapid apex beat was visible in the fourth and fifth intercostal spaces, four and a half inches from the mid-line. There was no thrill, and a harsh (grade III) systolic apical murmur was audible, conducted towards the axilla. Fine crepitations could be heard at the base of the left lung and the second pulmonary heart sound was accentuated. The tip of the spleen was palpable on full inspiration. Her urine was chemically normal, with no increase in red cells on microscopic examination. Her hæmoglobin level was estimated to be 11.2 grammes per centum (77%), and the white cells numbered 10,700

per cubic millimetre, with a relative increase in neutrophil cells (93%). Her blood sedimentation rate was 34 millimetres in one hour (Westergren). The electrocardiogram showed an inversion of the T wave in Lead III with flattened T waves in leads CF2 and CF4. Blood culture rapidly grew colonies of *Streptococcus viridans*. X-ray examination of the heart and great vessels revealed considerable generalized cardiac involvement with straightening of the left border of the silhouette. The uterus was enlarged to the size of a 24 weeks pregnancy. The cervix and vagina were healthy.

Penicillin administration was begun at once in fractionated intramuscular doses, amounting to two million units per day, and her temperature fell rapidly to normal from previous levels of 101° to 102° F. Her malaise disappeared, her appetite returned, and her appearance improved rapidly. She continued to show occasional Osler's nodes, and even a small infarct in a retinal artery, but the size of both her heart and her spleen diminished steadily. The crepitations at the base of the left lung were particularly slow to subside, and the sedimentation rate continued to be elevated until the termination of her pregnancy. The results of all subsequent blood cultures were negative, and penicillin administration was continued for two months. By this time she was out of bed, in a chair, and she continued to remain well while under observation in hospital until her confinement. No pre-natal difficulties presented themselves; the fetus occupied the left occipito-anterior position. She was delivered at term, without evidence of cardiac embarrassment following a seven-hour labour, of a healthy child weighing six and a quarter pounds. During and after labour she again received two million units of penicillin prophylactically.

#### Discussion.

This is unexplored territory and the ultimate prognosis is unknown. The sufferer from rheumatic or congenital heart disease who undergoes tooth extraction is liable to superadded valvular infection, whether pregnancy coexists or not, and should always be "covered" by penicillin if dental treatment is required. All pregnant women who have valve defects should also receive routine penicillin prophylaxis before and after delivery. Clinical recurrences of rheumatic fever are very rare during pregnancy, and a train of symptoms such as this woman presented should arouse the suspicion of bacterial endocarditis. The outcome depends upon the degree of preceding myocardial and endocardial damage, the age of the patient, the promptness with which the new infection is recognized and treated by penicillin, and the extent of valvular destruction. This patient was fortunate because her attending doctor quickly placed her in hospital for confirmation of his suspicions, and because she received an adequate dose of penicillin from the first, although the sensitivity of the organism had not then been determined. In pregnancy the value of the sedimentation rate as a criterion of cure is vitiated. Further, slight rises of temperature and evidence of embolism do not mean that cure has not occurred.

Penicillin therapy must be continued for six to eight weeks, and particular care must be taken of general and social measures to increase resistance and reduce heart strain, both as pregnancy advances and after the pregnancy. The ultimate fate of patients cured of this condition is as yet unknown. According to Hamilton (1947), eleven such women, "cured" of bacterial endocarditis, have survived a further pregnancy; three had abortions and six had living children. Mendelson (1948) reports seven cases at the New York Lying-In Hospital in which patients who acquired subacute bacterial endocarditis before or after conception have borne living children. He advises termination of pregnancy if the latter ensues within six months of the termination of penicillin therapy.

These cases are not common, and Hamilton has offered to form a registry of such records, so that sufficient numbers may be obtained ultimately to provide reliable statistics on prognosis. His address is: Dr. B. Hamilton, Cardiac Clinic, Boston Lying-In Hospital, Boston, Massachusetts, United States of America.



## References.

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- Mendelson, C. L. (1948), "Pregnancy and S.R.E.", *American Journal of Obstetrics and Gynecology*, Volume LVI, page 645.

# A REPORT ON RESIDUAL CEREBRO-SPINAL FLUID CHANGES IN A CASE OF INFLUENZAL MENINGITIS TREATED BY STREPTOMYCIN, SULPHADIAZINE AND RABBIT ANTISERUM, WITH RECOVERY.

By J. DE VIDAS, M.B., B.S., D.T.M., M.R.A.C.P.

THE specific treatment of influenzal meningitis beginning with chemotherapy and passing through the stages of rabbit antiserum and penicillin has culminated with streptomycin. Reports on the varying effectiveness of all these therapeutic measures, alone or in conjunction, are legion. In the writer's experience, where no speedy laboratory tests are available, a combination of sulphadiazine, rabbit antiserum and streptomycin seems best. However, this report is presented not to discuss treatment but to record the cellular changes in the cerebro-spinal fluid remaining after clinical recovery. These gross changes persisted well after the convalescent period. Their significance is impossible to assess from one case. Nevertheless, they would seem to indicate a reactive exudative process rather than an active one.

## Clinical Record.

A female child, aged three years, was brought for medical attention by her parents on November 22, 1948, solely because of abdominal pain. The pain was sudden in onset and of four hours' duration. Two weeks before she had suffered from a respiratory infection. On examination the child was listless and feverish. The abdomen was lax and no point of tenderness was found. She had photophobia and slight neck rigidity. The temperature was 104.4° F., the pulse rate 120 per minute, and respiration rate 30 per minute. She was admitted to hospital with a diagnosis of meningitis of unknown bacterial origin.

Soon after admission to hospital, about five hours after the onset of symptoms, the patient had a convulsion and head retraction was present. She was now vomiting. The sensorium was clouded with alternating stupor and delirium. Penicillin and sulphadiazine were given overnight, as these were the only drugs at that moment available.

The next day the patient was worse—lying in opisthotonus, semicomatose and making aimless spasmodic movements. The left plantar reflex was extensor. A lumbar puncture produced thick yellow purulent fluid at high pressure. Examination of a smear of the cerebro-spinal fluid revealed Gram-negative coccobacilli, later confirmed as being *Haemophilus* organisms by culture on chocolate agar. It was obvious that penicillin-sulphadiazine therapy was ineffective for this strain of *Haemophilus* organism.

About forty-six hours after the onset of the illness 15 millilitres of rabbit antiserum were given intra-

muscularly into each buttock. Streptomycin (100 milligrammes in 10 millilitres of sterile pyrogen-free distilled water) was injected intrathecally by lumbar puncture. Streptomycin (100 milligrammes every three hours) was also given intramuscularly. Administration of the penicillin was suspended, but the sulphadiazine therapy was continued.

Fifteen hours after the giving of the rabbit antiserum and the streptomycin, the cerebro-spinal fluid was merely cloudy; the patient was peaceful and taking fluids without vomiting. An intrathecal injection of streptomycin (100 milligrammes) was given and the intramuscular dosage of streptomycin was reduced to 50 milligrammes every three hours.

By the next day (November 26, 1948) the cerebro-spinal fluid was almost clear in appearance, and clinically the patient was obviously recovering. The sulphadiazine was stopped.

By November 27 the temperature was normal and the cerebro-spinal fluid looked crystal clear. A last intrathecal injection of streptomycin was given. The sensorium was clear and no abnormal signs were found on examination of the central nervous system. All treatment was stopped, the patient having had four grammes of streptomycin.

On December 2, 1948, the temperature began to rise again and a faint macular rash appeared on the skin. However, the patient was well and showed no abnormal signs or symptoms. A lumbar puncture was performed; 100 cells, mostly polymorphonuclear leucocytes, were present in the cerebro-spinal fluid. It was presumed that the rash was due to drugs or serum. The temperature subsided gradually, the patient remaining quite well.

On December 14, 1948, with the temperature again normal, another lumbar puncture showed 24 polymorphonuclear cells per cubic millimetre of cerebro-spinal fluid. The patient was well and active and she was discharged from hospital on December 20, 1948.

The child was brought to me ten days after discharge from hospital because of her having a fever. She had coryza and an elevated temperature. The clinical examination showed no nervous abnormality and the child was alert, active and happy. A lumbar puncture was performed. The cell count was 100 per cubic millimetre, but this time the cells were lymphocytes. The temperature subsided and the child was discharged from hospital on the third day after admission.

Three months after recovery the patient was examined again. She appeared normal except for post-influenzal alopecia.

## Discussion.

The cerebro-spinal fluid cell findings in this case call for special notice (Table I). The cells were abnormal in type and excessive in number well after the time of absolute clinical recovery. It appeared that there was a lag in the cerebro-spinal fluid improvement compared with the clinical improvement. The cellular response was carried over well after elimination of central nervous system infection. Streptomycin is an antibiotic, and it would appear from the events of this case that the natural antibody and cellular attack is evident for some time after the drug has done its work.

No explanation can be offered for the lymphocyte increase in the cerebro-spinal fluid late in the recovery

TABLE I.

Date.	Result of Cerebro-Spinal Fluid Examination.					
	Cells per Cubic Millimetre.	Globulin Content.	Chloride Content. Milligrammes per Centum.	Sugar Content.	Result of Smear Examination.	Result of Culture.
25.11.48 .. .. .	20,000 polymorphonuclear cells.	Increase.	735	Nil.	Positive.	Positive.
27.11.48 .. .. .	1,300 polymorphonuclear cells.	Slight increase.	770	Normal.	Negative.	Negative.
2.12.48 .. .. .	100 polymorphonuclear cells.	Slight increase.	735	Normal.	Negative.	Negative.
13.12.48 .. .. .	24 polymorphonuclear cells.	Slight increase.	740	Normal.	Negative.	Negative.
30.12.48 .. .. .	100 lymphocytes.	Nil.	745	Normal.	Negative.	Negative.

period, except that it may have been a response to streptomycin irritation of the theca or a non-specific protective exudation.

#### Summary.

1. A case is described of influenzal meningitis in which the patient was treated by intrathecal and intramuscular injections of streptomycin, sulphadiazine and rabbit anti-serum.

2. The cellular changes in the cerebro-spinal fluid towards normality lagged considerably behind clinical recovery. More streptomycin than was needed was probably given because of this.

3. A late lymphocytic exudate occurred in the cerebro-spinal fluid after recovery. The circumstances of the case showed that it was not connected with the presence of infection, but rather with some unspecified protective exudation.

### ATYPICAL TUBERCULOSIS OF THE ANUS TREATED WITH STREPTOMYCIN.

By T. EDWARD WILSON and E. J. A. NUFFIELD,  
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TUBERCULOSIS of the anus is a condition that is rarely seen in Australia, either in the form of a typical and easily recognized tuberculous ulceration of the anus and of the perianal tissues or in an atypical form. The case reported here is an example of the latter, and cure was apparently obtained by the use of streptomycin.

#### Clinical Record.

Mrs. A.H., aged sixty-one years, was referred to one of us (T.E.W.) by Dr. G. W. Ashby on December 7, 1948, complaining of bleeding from the anus for nine months and of a purulent discharge from the anus and pain on defecation for three months. She had not suffered from chest troubles. One son had suffered from pulmonary tuberculosis ten years ago, though he is now apparently cured. Apart from mild *diabetes mellitus*, which was under control, the patient had enjoyed very good health.

On examination she appeared to be slightly pale and listless. Examination of the heart and abdomen revealed no abnormality. There was good air entry throughout both lungs, the breath sounds were vesicular, and the vocal resonance was normal. A few râles were audible in the left interscapular area. The inguinal lymph glands were not enlarged. Firm, exuberant granulation tissue extended around the anus for about two centimetres; beyond that the perianal skin appeared to be normal and uninfected. The granulation tissue appeared healthy and did not resemble the granulation tissue typically present in tuberculous ulceration of the anus. In addition, there was a short, quiescent, low-level anal fistula in the left lateral quadrant. There was no undermining of the skin of the anus. On digital examination the anal canal was firm and inelastic, and was quite tender. All the mucosa of the anal canal was destroyed by an ulcerative process which extended to the ano-rectal ring. Proctoscopic examination showed intact and normal mucosa above the ano-rectal ring to a distance of 12 centimetres from the anus. Further sigmoidoscopy was not possible because of the pain. There was no evidence of tuberculosis on X-ray examination of the chest or on examination of the sputum. The blood haemoglobin value was 11.3 grammes *per centum*.

Under spinal anaesthesia induced by Dr. A. H. Hodge a biopsy was performed, and on the pieces of tissue removed Dr. A. E. Gatenby reported that examination of sections showed the tissue to be tuberculous. Numerous tubercle follicles and tubercle bacilli were present in the sections. On December 15 the fistula was excised and the surface of the resulting wound and the granulation tissue were coagulated with the diathermy electrode. Tubercle bacilli were not seen in smears from the fistula and were not recovered on culture. After the excision of the fistula the

patient complained of increased pain in the anus, and on December 22 a left inguinal colostomy was performed. After the completion of this colostomy the anal wound was dressed with zinc peroxide (Marino, quoted by Bacon, 1945) and the distal part of the bowel was washed through with saline till all the faecal material was removed from it.

For the first six weeks in hospital the patient's temperature varied and occasionally it rose to 99° or 100° F. For the last month in hospital her temperature did not rise above 99° F. By January 10, 1949, there was no further extension of the disease, but the wound was showing very little evidence of healing. A course of streptomycin was commenced. It was intended to give injections of streptomycin for at least four weeks, starting with 0.5 gramme twice a day and then increasing the dose. Unfortunately she soon complained of extreme giddiness and of some nausea. By January 26 considerable healing of the wound had occurred and the streptomycin was discontinued. The giddiness and nausea slowly subsided, and on February 21, 1949, she was discharged to her home. The colostomy was then functioning satisfactorily, she stated that she was feeling very well, and all the inflammatory reaction in the anus and anal canal seemed to have completely subsided. However, the anal canal had contracted down until it was only possible to introduce the little finger into it with difficulty. Since then further contraction of the anal canal has developed.

#### Discussion.

According to Gabriel (1948) the possible sources of infection in tuberculosis of the ano-rectal region are (i) from swallowed sputum or ingested milk, (ii) by the blood-stream from a focus elsewhere in the body, (iii) by direct inoculation from the fingers, and (iv) by direct extension from a focus in the pelvis or spine. In this patient there was no evidence of another focus of tuberculosis, and that is by no means uncommon in patients with anal tuberculosis. It is presumed that she has had a latent infection since the time when her son suffered from pulmonary tuberculosis and that her anal lesion was due to a recent infection by the blood-stream.

Various methods have been proposed for the treatment of tuberculosis of the anus. These include attempts to improve the general condition, local antiseptic applications, and attempts to remove the local lesion by excision and coagulation. Lockhart-Mummery (1923) states that extensive cauterizing of these ulcerated areas is unwarranted because of a poor tendency to repair; but this applies only to the patient who has very extensive and deep tuberculous ulceration about the anus and who is very debilitated. In this case there was no contra-indication to local excision. The above methods of treatment were therefore carried out with the addition of a short course of streptomycin.

When this patient was admitted to hospital tuberculosis was not regarded as a likely diagnosis because the granulation tissue appeared to be so healthy, the skin edges were not undermined, the perianal tissues were indurated, and the lesions extended so little out on to the perianal skin compared with the spread up the anal canal. The other diseases considered in the differential diagnosis were cancer of the anus and sloughing internal haemorrhoids. Although the macroscopic appearances were not typically those of an epithelioma of the anus or of an adenocarcinoma of the rectum which had extended downwards through the anal canal, it was chiefly to exclude the presence of a neoplasm that a biopsy was performed.

Owing to the extent of the inflammatory reaction and the inevitable fibrosis of the perianal tissues that must have resulted, it is most unlikely that there still exists a sphincter mechanism that is capable of functioning satisfactorily.

#### References.

- Marino, quoted by Bacon, H. E. (1945), "Anus, Rectum, Sigmoid Colon", Second Edition.
- Gabriel, W. B. (1948), "The Principles and Practice of Rectal Surgery", Fourth Edition.
- Lockhart-Mummery, P. (1923), "Diseases of the Rectum and Colon".

# CONGENITAL HEART DISEASE AND SUBACUTE BACTERIAL ENDOCARDITIS WITH EMBOLIC PHENOMENA OCCURRING ONLY IN THE LUNGS.

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Sydney.

## Clinical Record.

M.T., aged twenty years, consulted me on November 14, 1947. She gave a history of being ill intermittently for seven months with increasing breathlessness, pain and aching across the shoulders and prolonged treatment in bed for atypical pneumonia with recurrences during that period.

On examination of the patient, her temperature was 101° F. and her pulse rate 112 per minute. She had a pronounced systolic murmur and thrill in the pulmonary area radiating outwards towards the shoulder, and early clubbing could be detected in her fingers. She was advised to go to hospital for further investigation and treatment, as I had examined this patient when she was aged four years and had noted the pulmonary murmur and suspected infection in connexion with it. Her temperature, which was swinging during her time of waiting at home for a hospital bed, settled down soon after her admission to hospital, until she was allowed out of bed and exercised lightly, when it immediately rose to 101° F., and blood taken at that time yielded a growth of *Streptococcus viridans*.

She had a rather persistent cough and some slight dullness at the base of the left lung and in the axillary region. Microscopic examination of the urinary deposit revealed an occasional leucocyte and epithelial cell and one erythrocyte per high-power field on one occasion only. Three other examinations revealed no red cells and no growth on attempted culture.

Fluoroscopic examination of the chest was carried out by Dr. H. M. Cutler on November 25, 1947; he reported as follows: "There is a slight prominence of the pulmonary conus but no evidence of auricular enlargement and no abnormality of the ventricles. No pulmonary congestion or hilar dance were seen." On viewing the antero-posterior film Dr. Cutler reported on November 21 that there was some fibrosis with surrounding inflammatory reaction. He stated that he could not exclude cystic disease of the lung. On December 3 he reported on a further antero-posterior film as follows: "Clearing has occurred and the condition now appears to have been of simple inflammatory origin."

The patient's blood sedimentation rate at this time was 40 millimetres in one hour (Wintrobe method) and a blood count gave the following information: the erythrocytes numbered 4,600,500 per cubic millimetre, the haemoglobin value was 11.6 grammes *per centum* and the colour index was 0.84; the leucocytes numbered 5400 per cubic millimetre, 70% being neutrophile cells, 14% band forms, 25% lymphocytes and 5% monocytes.

The patient was examined in consultation by Dr. T. M. Greenaway, who suggested that as the blood shunt was from left to right, emboli were thrown into the pulmonary circulation only, and probably accounted for her recurrent ill-health during the last nine months, including the "atypical pneumonia". It was decided to give her penicillin, 1,000,000 units a day for fifteen days.

This was done. No further rises in temperature occurred, her pulse rate fell to 72 per minute, the cough disappeared, and when she was examined on February 2, 1948, five weeks after leaving hospital, she reported that she had had no temperature rises and no cough, was not breathless and had gained twelve pounds in weight. She was still well when examined five months later.

## Discussion.

John H. Seabury (1947) reviewed a series of 165 patients treated for subacute bacterial endocarditis over a ten-year period—June, 1934, to May, 1945. He stated that congenital heart disease as a predisposing factor occurred

in 15.2% of patients in his series, that embolic phenomena occurred in 57% of all cases including those of rheumatic and congenital heart disease, and that definite evidence of pulmonary embolism was found in 17 of 24 patients with congenital heart disease. However, no mention was made of any case in which the embolic phenomena were restricted to the lesser circulatory system.

Walter K. Myers (1947) reported a case of gonococcal endocarditis of the pulmonary valve successfully treated with penicillin, in which multiple pulmonary infection and its sequels were the main features of the case, and in which at no time was the spleen palpable or were peripheral embolic phenomena present.

I had attended this patient intermittently since she was aged four years, and at no time had she shown signs of clubbing of the fingers until November, 1947. Also, at that time the pulmonary systolic murmur had become harsher and the thrill more evident than when she was examined a year previously. Since the successful treatment with penicillin, both these signs have reverted to their original state.

The chief interest in her case was in the correlation of the chest conditions with the cardiac infection in the absence of embolic phenomena in the greater circulation.

## Acknowledgement.

I freely acknowledge the help and cooperation of Dr. T. M. Greenaway in making this clinical picture clear.

## References.

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- Seabury, J. H. (1947), "Subacute Bacterial Endocarditis: Experiences during Past Decade", *Archives of Internal Medicine*, Volume LXXIX, page 1.

# THE TOXIC EFFECTS OF FLUORESCENT LAMPS.

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It is timely that the hazards existing in the handling of fluorescent lamps should be generally known. The large increase of fluorescent tubes in common usage today, both for industrial and for domestic lighting purposes, has increased the risk of illness or injury.

Ignorance of the dangers existing is instanced by two cases from industry in my practice, as well as by a survey conducted by a laboratory in the United States of America under the auspices of Consumers' Research, Incorporated, Washington, New Jersey.

There is a possibility of very serious injury by glass from a broken tube of a fluorescent lamp, if there is a cut from the glass, or if the powdered material (phosphor) from the surface of the glass enters a wound or cut.

## Chemistry of Phosphor.

The powder "phosphor", which is used to line the interior of the lamp, commonly contains a small percentage of the metal beryllium, which has recently been found to have highly toxic properties. The coating is used to give off visible useful light when it is struck by ultra-violet rays created when the electric current feeding the lamp energizes the gas in the tube. The exact composition, as far as can be ascertained, is a trade secret.

## Case I.

Miss D.E., aged twenty-nine years, a machine operator in a rope works, reported to my surgery on September 28, 1947, with a laceration on the left wrist caused when an overhead fluorescent tube dropped from its socket and broke. The laceration was approximately three-quarters of an inch long and bled freely. Two sutures were inserted, an acriflavine dressing was applied, and 500 units of antitetanus serum were given. The wound after five days broke down along the extent of the scar with



a great deal of suppuration. The resultant area after four weeks was approximately one and a quarter inches long with unhealthy granulation tissue. Various local applications were applied, including penicillin-sulphanilamide powder; but finally the whole area along the scar was surgically excised and resutured; this treatment was successful. The time taken for healing from the time of receipt of the injury was in all nearly four months.

#### Case II.

Mr. J.C., aged forty-five years, is a maintenance engineer employed in a large hosiery mill at Brunswick, Victoria. One of his duties is to replace the burnt-out fluorescent tubes throughout the building, and over a period of time he had collected about 84 burnt-out lamps. He attempted to dispose of the latter by smashing the tubes, as their length made them difficult of disposal. After breaking several lamps he noticed a "pricking sensation" on the dorsum of both hands, due no doubt to the fine pieces of flying glass; he broke about four tubes only. One week later he found the burning sensation so great that he was unable to keep his hands under the bedclothes at night. He was referred for attention, and on examination the affected areas were found to be covered with multiple keratoses—in all about 20 areas on each hand and forearm, varying in size from one millimetre to four or five millimetres. He was referred to a skin specialist for treatment.

#### Discussion.

A report of similar cases is given by Consumers' Research, wherein the following statement is made:

The process of healing would begin and then break down. In three other cases there were similar wounds, and tumors occurred which resembled those found in the lungs of fluorescent lamp workers who had breathed fluorescent lamp powder. (The cause of their death was chronic pulmonary granulomatosis.)

Lamp makers have begun experiments with synthetic, non-metallic powders to replace beryllium, but in the meantime it is extremely important that the lamp user shall exercise every caution in disposing of fluorescent lamp tubes, and above all shall dispose of them in such a way that they cannot come into the hands of children, who, in playing with the discarded lamps, are almost certain to be subjected to the dangers referred to. Dust or fumes from the materials in the lamps must be prevented by all possible means from getting into the human system, either through a wound or through the nose or mouth; it would be almost impossible to prevent such entry in the case of a child playing with a lamp tube or with broken pieces of a tube.

The danger described is so great that power companies and lighting engineers have contrived a special machine for breaking up the tubes, which encloses the lamp tubes within a strong metal case and breaks them under water under carefully controlled conditions. The personnel engaged in the task are protected with gloves, goggles, face masks and other suitable means. There is no advice to consumers that can be given at this time in brief space about a safe and convenient way of breaking lamp tubes under home conditions.

Besides the beryllium powder in the lamp, there is another source of toxic material—the mercury, and when the lamp is broken, mercury vapour, which is poisonous (with long exposure) even in incredibly dilute quantities in the air, is released; besides, metallic mercury may become deposited in cracks of the floor, table, sink or other household equipment, to give up its toxic vapours for a period of perhaps months or years. The mercury hazard may be serious, but the beryllium danger is very much more serious and immediate, and is accordingly emphasized in this discussion.

In addition to the special precautions which have been noted, let us sum up with the following specific advice:

1. Never discard fluorescent lamps by placing them with rubbish or refuse where they can be carelessly handled or broken.
2. Never destroy them in incinerators.

3. Do not permit them to be disposed of where children may have access to them or can play with them.

One large lamp company's safety bulletin mentions that the glass is very fine and penetrating and often flies with a good deal of force when a tube is broken. The advice is also given that "anyone who should happen to break a fluorescent bulb should receive medical attention immediately to make sure he has received no cuts with this beryllium-contaminated glass".

## Reviews.

### FAILURES IN PSYCHIATRIC TREATMENT.

"FAILURES IN PSYCHIATRIC TREATMENT", edited by Paul Hoch, of the New York State Psychiatric Institute, is a collection of fifteen papers read at the 1947 annual meeting of the American Psychopathological Association, with a brief discussion commentary appended to each.<sup>1</sup> This method of presentation, whereby contributions are restricted to between ten and twenty pages, naturally limits the scope of each article. Subject to these limitations, psychiatric treatment with particular emphasis on causes of failure is comprehensively covered, though the book cannot be recommended to readers without knowledge and experience in practice. It shows clearly the advances in knowledge and technique which have taken place in the last few years and are leading to almost a series of sub-specialties.

In the introductory chapter Nolan Lewis lays down some general principles. There are two aims in treatment—the psychological integration of the individual personality, and an improved relationship between the patient and his social contacts. In this process four types of constitutional handicap may be encountered that are susceptible of only limited modification—somatic inferiority, intellectual defect, limited emotional maturity and basic defects in judgement. Another important factor, about which little is so far known, is to decide the most favourable time for the initiation of therapy. Although owing to the various schools of thought modern psychotherapy has not yet become a well-integrated discipline, the aims of treatment are the same, namely, the restoration of the patient to a state of mental health, by relieving his anxieties and giving him self-confidence to solve the problems of his life.

The opening paper by C. P. Oberndorf deals with psychoanalysis. The object of analysis, he states, is "to secure the best possible functioning of the ego". This process, to use Freud's own definition, "is simply the study of mental processes of which we are unaware, by the free association technique of analysing the unobservable phenomena of transference and resistance". One rather admires the use of the word "simply". Technical approaches differ from "passive attempts to divine the patient's repressed thoughts, to pounding his impervious protective narcissism". More than most of the others, this article suffers from its brevity. Freudian concepts are not critically examined, other analytical methods, such as Jung's or Adler's, are not mentioned, and difficulties of technique—mainly related to the problems of transference—are dismissed as "too numerous and controversial". "The psycho-biological method" of Adolf Meyer is dealt with by Muncie. As this comprehensive approach to the problem of mental illness is the outstanding American contribution to the subject, it is of interest to note the rather defensive attitude adopted.

The paper on "Hypnosis", by Lewis Wolberg, is one of the best in the book. Whilst dealing with the limitations of hypnotic treatment, and the necessity for combining it with other forms of psychotherapy, the examples quoted of failures and successes are impressive and often entertaining. Of equal merit is Abrahamsen's thought-provoking address on the "Evaluation of Treatment of Criminals". Whilst careful to avoid exaggerated claims, he makes it clear that more can be done, and is beginning to be undertaken in some centres in the individual psychiatric treatment of criminals. In this the author finds that difficulties of transference are likely to be enhanced by the defensive attitude of the patient, and the artificial prison environment. The great importance of interfamily relationships is stressed, the author claiming that "if these are not changed, it is difficult, if not impossible, to alter the personality of the delinquent". Preventive therapy in childhood is the ideal. There are peculiar difficulties, however, in psychotherapy of children, as

<sup>1</sup> "Failures in Psychiatric Treatment", edited by Paul H. Hoch, M.D.: 1948. New York: Grune and Stratton. 8½" x 5½", pp. 250, with illustrations. Price: \$4.50.

Ackerman and Neubauer's contribution on this subject makes clear. It is their impression that "whilst theoretically the treatment of children ought to offer greater possibilities of success than in the case of adults, failures are actually more common". This paradox may be in part due to technical problems and "the limited power of the therapist to modify the total emotional atmosphere of family life".

"Failures in Psycho-Somatic Treatment" are ably dealt with by Bela Mittelman, who in his introductory remarks gives perhaps the best summary in the book of the general types of failure common to all forms of therapy. Firstly, both psychological and organic symptoms may be unrelieved. Secondly, psychological symptoms may be relieved, but the organic syndrome remain unaltered, or the organic condition may be relieved, but the psychological symptoms become progressively worse. Interesting case studies under these heads are presented. The further fact that serious errors in treatment may be a potent cause of failure is frankly pointed out. The remaining papers deal with failure in the use of such physical methods of treatment as electro-convulsive therapy, insulin therapy and lobotomy. Group therapy is evaluated, and the role of heredity in relation to treatment is considered.

A perusal of this stimulating little book makes it clear that although psychiatry has advanced greatly in the past fifty years, and now takes its place without apology as an important part of scientific medicine, much still remains to be discovered and applied in the treatment of the mentally ill.

#### MODERN TRENDS IN DERMATOLOGY.

A VOLUME of the "Modern Trends Series" on dermatology, edited by R. M. B. McKenna, whilst it has already found its place in the library of dermatologists, is well worth the reading by all, and this must embrace physicians and general practitioners in whose daily round skin manifestations are significant.<sup>1</sup>

The editor has welded together the various chapters, each written by a specialist in his own field, so that the whole may indicate the direction of modern thought, without each becoming disarticulated from the other.

As Stokes and Beerman point out in the opening chapter, the morphological era in dermatology is being succeeded by a functional one, still in its beginnings, but already responsible for great advances.

Included is an exhaustive survey of advances in anatomy, physiology, biochemistry, bacteriology and nutrition in relation to dermatological disorders.

The review of the psychological aspects of dermatology by Wittkower is both fascinating and stimulating—"discontinuity of the skin is a hole through which much unhappiness can drain". One finds appreciated in almost every chapter the importance of this modern trend which may not really be so modern when one recalls the horse-sense of the horse and buggy doctor. Especially is this true of a new aspect of the subject—the rehabilitation of patients suffering from skin diseases. As pointed out in this chapter, rehabilitation should commence as soon as the patient begins to show symptoms. One of the main causes of chronic invalidism in skin diseases is the shortage of beds, preventing the early admission to hospital and early cure of those with skin conditions who are left to apply their treatment in a haphazard fashion at home till they are admitted at length in a state of polysensitization and as "chronics". This applies to some capital cities in Australia.

The chapter on modern trends in therapy is very well balanced, the author avoiding the temptation to list modern fashions and again warning readers against the indiscriminate use of local applications such as sulphonamides whose sensitizing properties outweigh advantages they may have over other local remedies. The chapter on irradiation is disappointing; it does not stress the importance of even tumour dose and omits reference to the work of Paterson and Parker.

The book is rounded off with a chapter on the use of statistics which is both comprehensible to the non-mathematical mind and enlightening. In view of the principles therein enumerated one is surprised to find in another chapter a list of the factors which affect the incidence of prickly heat based on a study of 46 officers in a warship.

We look forward to the continuation of this series.

<sup>1</sup>"Modern Trends in Dermatology", edited by R. M. B. MacKenna, M.A., M.D. (Camb.), F.R.C.P. (London): 1948. London and Australia: Butterworth and Company (Publishers), Limited. 10" x 6½", pp. 452, with illustrations. Price: 55s. 6d.

#### Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Handbook of Materia Medica, Toxicology and Pharmacology: For Students and Practitioners of Medicine", by Forrest Ramon Davison, B.A., M.Sc., Ph.D., M.B.; Fourth Edition; 1949. St. Louis: The C. V. Mosby Company, Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 8½" x 5½", pp. 738, with 35 illustrations. Price: 64s.

The author's aim is to present information about drugs essential for the student of medicine and the practising physician.

"Current Therapy, 1949: Latest Approved Methods of Treatment for the Practising Physician", edited by Howard F. Conn, M.D.; 1949. Philadelphia and London: W. B. Saunders Company, Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10½" x 8½", pp. 714. Price: 70s.

An attempt to supply the practitioner with a method of treatment endorsed and used by a competent authority.

"Ward Administration and Clinical Teaching", by Florence Meda Gipe, M.S., R.N., and Gladys Sellen, Ph.D., R.N.; 1949. St. Louis: The C. V. Mosby Company, Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 8½" x 5½", pp. 342, with 21 illustrations. Price: 32s.

Written for teachers and administrators in nursing.

"The Driving Forces of Human Nature and their Adjustment: An Introduction to the Psychology and Psychopathology of Emotional Behaviour and Volitional Control", by Don Thomas Verner Moore, Ph.D., M.D.; 1948. London: William Heinemann (Medical Books), Limited. 9" x 5½", pp. 474. Price: 35s.

An attempt to "put together" the trends in the development of psychology and to illustrate some methods of treating disorders of the mind.

"A Dictionary of Scientific Terms: Pronunciation, Derivation, and Definition of Terms in Biology, Botany, Zoology, Anatomy, Cytology, Embryology, Physiology", by I. F. Henderson, M.A., and W. D. Henderson, M.A., B.Sc., Ph.D., F.R.S.E.; Fourth Edition, by John H. Kenneth; 1949. Edinburgh: Oliver and Boyd. 8½" x 5½", pp. 500. Price: 32s.

The scope of the volume is clear from its title; some two thousand additional terms have been introduced into this edition. The last edition appeared in 1939.

"Psycho-Analysis: A Handbook for Medical Practitioners and Students of Comparative Psychology", by Edward Glover, M.D.; Second Edition; 1949. London: Staples Press, Limited. New York: Staples Press, Incorporated. 8½" x 5½", pp. 370. Price: 15s.

Designed to give the practitioner some idea of the existing scope and future possibilities of psychoanalysis.

"Roentgen Diagnosis of the Extremities and Spine", by Albert B. Ferguson, M.D.; Second Edition, Revised and Enlarged; 1949. New York: Paul B. Hoeber, Incorporated. 10½" x 7½", pp. 548, with 631 illustrations. Price: \$15.00.

The author has confined himself to "material of diagnostic utility".

"Modern Treatment Year Book, 1949: A Year Book of Diagnosis and Treatment for the General Practitioner", edited by Sir Cecil Wakeley, K.B.E., C.B., D.Sc., F.R.C.S., F.R.S.E., F.A.C.S., F.R.A.C.S. (Hon.); 1949. London: The Medical Press. 8½" x 5½", pp. 478, with a few illustrations. Price: 15s.

A series of 41 articles by different authors.

"Rapid Microchemical Methods for Blood and CSF Examinations", by F. Rappaport, Ph.D., with a foreword by F. Silberstein, M.D.; 1949. New York: Grune and Stratton, Incorporated. 8½" x 5½", pp. 428, with 72 illustrations. Price: \$8.75.

Intended for biochemists, clinical pathologists and medically trained persons interested in research.

"Massage and Remedial Exercises in Medical and Surgical Conditions", by Noel M. Tidy; Eighth Edition; 1949. Bristol: John Wright and Sons, Limited. 8½" x 5½", pp. 500, with 190 illustrations. Price: 25s.

An attempt to give an account of various methods of treatment and to indicate where further information about them may be obtained.

"Experimental Surgery: Including Surgical Physiology", by J. Markowitz, M.B.E.; Second Edition; 1949. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson. 9" x 6", pp. 564, with 330 illustrations. Price: 52s. 6d.

Intended for use in laboratories in which animals are used for medical research.

## The Medical Journal of Australia

SATURDAY, SEPTEMBER 10, 1949.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

### THE GOLDEN AGE OF MEDICINE.

THE golden age is said to have been the ideal period, when the earth produced fruits without cultivation, when warfare was unknown and man lived in perfect happiness. All this is said to have occurred under the reign of Saturn and the golden age was followed by the ages of silver, brass and iron. The term has been applied to the periods of highest development in sculpture, literature, painting, music, and so on. Thus the golden age of sculpture was the age of the ancient Greek civilization; the golden age of painting came with the Renaissance; and the golden age of music at the end of the eighteenth and the beginning of the nineteenth centuries. Thinking these things, we naturally ask what is the golden age of medicine? The answer that must be given is that the present is the golden age of medicine. Never before has the scientific background of medicine attained such a high state of development—and it is scientific background alone with its resulting achievement which must be the criterion in this matter. It is probably true that advances, yet undreamed of, will in the near future be made in the field of medicine—that diseases now obscure will be illuminated by understanding, that many of these diseases will, because of this understanding, be prevented, and that new and effective remedies will be discovered for the cure of those not caught in the cordon of prevention. If we look back on the advances made in clinical medicine since the dawn of the present century, during the professional life of the senior members of the profession, we must stand amazed. It would be of interest to make a review of these advances, but the task cannot be attempted. A great deal of the ground is covered in the articles contributed to the "Silver Jubilee Number" of this journal in July, 1939, by Sir Charles Blackburn, Sir Henry Newland, Dr. F. S. Hone, Dr. C. H. Kellaway and Dr. F. M. Burnet. Since 1939 the advances have been well sustained and extended. It would be simple to refer to the plight of a patient with, say, pernicious anaemia early in this century and to his happier outlook today, or to describe the grim future of the diabetic in the pre-insulin era in contrast with his comparative security at the present time. It would also stress the

obvious to refer to the changes that have taken place in surgery of the thorax and of the central nervous system. These advances are for all to behold. Not so obvious is the increasing emphasis on the part played by the basic sciences in the progress of medicine, on the care of man as a sentient thinking being in addition to his cure as a suffering mortal, and on the influence of environment on the individual. When future advances come, all these aspects will be woven into the general pattern of endeavour. We may thus conclude that the present golden age of medicine is not only this golden age of achievement but also the golden age of opportunity.

It is to the golden age of opportunity that we must turn, for to rest in satisfaction at the *status quo* is to be complacent. To this end reference may be made to a recent address by Alan Gregg at the annual session of the American College of Physicians on April 21, 1948.<sup>1</sup> The meeting was held at San Francisco and this accounted for the title of the address: "The Golden Gate of Medicine". Gregg had a good deal to say about the dangers of over-concentration on and over-emphasis of the causation of disease. One of the effects of constant interest in causation has in his opinion been to regard the patient as presenting an intellectual puzzle. This attitude, he admits, is in many ways an immeasurable improvement on the "fumbling and bewildering empiricism" of an earlier day. "But to regard a malady as an intellectual puzzle, provides the physician with such an absorbing task that he commits the commonest error of the scientific mind; he forgets, or overlooks, or ignores some important variables in the equation he is attempting to solve." Fascinated by the revelations of bacteriology, immunology, cellular pathology, biochemistry, biophysics and physiology, the clinician of the past two generations has taken at times too little account of the psychological factors—the patient as a person, the emotional aspects of his disorder, and the disorder of his emotions. Gregg thinks that if the search for the direct and single and ultimate causes of disease is to continue to be the dominating preoccupation of medicine for the next two generations, there will be a continuing neglect of chronic disease, of rehabilitation therapy, of the psychological counterparts of disease, and of the art of medical education. In other words, if the outlook of the practitioner is to be one-sided, his actions will tend to be one-sided. The way in which Gregg brings medical education into his discussion is interesting, as are also his remarks on specialism and the training and approval of specialists. His reason for reference to the certification of specialists is that present defects illustrate a danger to the "most precious element" in any profession. He remarks that when a cell becomes highly differentiated it loses its power of regeneration; thus the demands of a highly specialized and exclusive activity endanger the capacity for change and growth, for regeneration and continuity. Gregg asserts that we must fend for the future of medicine by protecting its freedom to change and grow. There is no surer way of seeing the potentialities of a subject than to examine its relation to all that is not it, but is around it. "It is an extension, not a negation of clinical medicine to explore its own outside relations; the relations, for example, of somatic and organic disease to the findings of psychologists, sociologists, and geneticists." Here lies one of the avenues of "golden

<sup>1</sup> *Annals of Internal Medicine*, April, 1949.



opportunity". The individual is so often contrasted with the mass that the word has acquired the connotation of isolation and separation. Gregg rightly insists that the essence of individuality is the uniqueness of the individual's ties to his environment and the indivisible cohesion or inseparability of those ties. Gregg forbears to list opportunities for the promotion of variety and freedom, but he offers two "hints" for those embarking for new destinations in medicine. One is that efforts should be made to encourage the recording of unexplained phenomena—much might be written on this subject. The other is that more importance should be attached to the mental processes by which the relationships between observed phenomena are interpreted. There could in medicine, as in law, be rules of evidence—a course called "Evidence" might be instituted in medical schools. "The incapacity to think straight flourishes like a weed in the virgin soil of our rank neglect of the meaning and use of words," Gregg adds: "This tare is watered by an ignorance of the laws of probability and sunned by callow personal ambitions."

From the short account of some of the views put forward by Gregg, readers, if they care to, will be able to formulate their own ideas of how opportunity in the future may be met. It is certain that opportunities are useless to one who is unprepared mentally to use them. We all talk glibly about freedom in medicine, but we must remember that the first freedom to be sought is the freedom for scientific medicine to grow and to develop. This will not be possible unless those who practise medicine seek to extend the present golden age. Anything less than unselfish and wholehearted devotion will mean that the golden age will be tarnished and in the end followed by one of silver or of brass or even of iron.

## Current Comment.

### JOSLIN ON DIABETES MELLITUS.

E. P. JOSLIN is not only one of the best known authorities on *diabetes mellitus*; he is also a stimulating exponent of his subject. A remark seemingly characteristic of his outlook opened a paper which he read at the 1948 Annual Session of the American Medical Association:<sup>1</sup> "Fifty years ago we struggled to keep patients alive, but now we strive to keep them healthy." In that striving his versatile mind is prepared to seek out and exploit every possible aspect of the doctor's knowledge and management of the disease and of the patient's cooperation and understanding of his own condition. He appears to be incurably optimistic; while facing frankly the attendant problem of arteriosclerosis, he points out that death from diabetic coma is nowadays rare and yet "during the first fifteen years of this century, we felt decidedly more hopeless when confronted with a case of diabetic coma than we do today with the problem of arteriosclerosis". "At any rate", he remarks, "we have carried our diabetic patients up into the arteriosclerotic zone", and he produces records of patients who have escaped this complication after long periods, perhaps, though not yet certainly, because of carefully observed treatment and constant control of the diabetic condition. Most physicians will agree with the importance of constant control, though some have questioned it, but its achievement is not easy. Joslin emphasizes the need for a careful follow-up of every patient. He is not so much concerned with a particular type of treatment or a specified frequency of visits as anxious "for the patient

and doctor to be in partnership, always in contact, the disease to be controlled and all untoward symptoms and signs noted promptly and rectified". The doctor's care must include regular examination and investigation of all aspects of the patient's physical condition. "Only 1.9 per cent of my patients now die of coma", Joslin states, "and therefore, when they come to the office, the physician should protect them against the 98 per cent other causes." After making an interesting comparison between diabetes and epilepsy, he points out that the family doctor is the doctor *par excellence* for epileptic and diabetic patients, and that he should be made to feel it and help in the details of treatment. "In fact", Joslin adds, "any student who thinks that he wants to become a diabetes specialist should remember that today only 1.9 per cent of the diabetic patients die of their disease and therefore he must be up to date in 98.1 per cent general medicine if he expects to give his patient adequate care"—salutary words indeed, which might well *mutatis mutandis* be the subject of two minutes' daily meditation by all young aspirants to narrow specialization.

It would not be practicable to reproduce in detail Joslin's comments on treatment, but this paper, as well as a paper read by him some six months later at the Interim Session of the American Medical Association,<sup>1</sup> warrants the attention of all who have the care of diabetics. Insulin is still the sheet anchor of his scheme of treatment and, indeed, he believes that its use should be more widespread. Success in avoidance or cessation of its administration may be illusory; on this score Joslin comments: "If it is difficult for me after fifty years, during which I have treated over 33,000 patients with sugar in the urine, to get through my head that I have never cured a diabetic person, how easy it must be for others, when queer results occur, to think that they have done so." He stresses also the value of dietetic measures, and aims by means of diet and insulin to keep the blood sugar level as nearly normal as is safely possible. Having had twenty-five years' experience of treating diabetes before the advent of insulin, he considers that "all insulins are good", but is none the less interested in new developments. In the second of the two papers mentioned he reports on the use at a diabetic children's camp of a new modified protamine zinc insulin, which has a much reduced protamine content and can be mixed directly with unmodified or regular insulin to allow for administration of both in a single injection; the results were very favourable (detailed reports are to be published later) and indicated a distinct advance. Other recently suggested agents in treatment are discussed, such as choline for protection of the liver and prevention of premature arteriosclerosis, inositol and vitamin E for the treatment of vascular complications, but Joslin reserves judgement. He hesitates "to divert a diabetic person's attention from the use of diet, insulin and exercise and the constant control of his disease by giving other medicines, unless they are definitely indicated". In considering the general management of the patient, however, he lays much stress on certain aspects: the value of diabetes camps for children, which relieve their families for a short period of the constant strain of looking after them and provide an opportunity for thorough investigation and assessment of their condition under most favourable circumstances; the need for nursing homes ("hospitals are too expensive") where diabetic persons can be taught and where the increasing number of aged diabetics can be cared for, particularly in their final illness; the need for personal detailed care and guidance in all aspects of living by the patient's own doctor, a type of care not readily forthcoming from a government-controlled system or even from a hospital outpatient department; finally, the importance of the patient's own zealous cooperation in treatment, which must be stimulated by the doctor's personal interest and by every other means—they give a medal in America to a patient who has "lived longer with his disease than he was expected to live without it, as estimated by life insurance expectancy tables" and are now awarding a special Victory Diabetic

<sup>1</sup>The Journal of the American Medical Association, January 1, 1949.

<sup>1</sup>The Journal of the American Medical Association, June 18, 1949.

Medal for those who have had undoubted diabetes for twenty-five years and are in sound health. The award of these medals is not quite so bizarre as it may seem at first sight, for it is hoped that by finding out those eligible and studying their treatment and lives useful information may be obtained.

Two other major subjects in Joslin's papers may be referred to in conclusion. At the time of writing his first paper he had just completed treatment in a series of 92 cases of diabetic coma without a death; he used neither dextrose nor alkalis, and calls attention to the simplicity of his system of treatment which is reproduced in detail in the paper. The last point is the quest for the million unknown diabetics in the United States. Limited surveys have indicated that for every known diabetic there is one who is unaware of his condition; therefore, a campaign has been instituted to find the unknown diabetics corresponding to the approximately one million known diabetics in the country. Joslin feels that extensive surveys may be largely avoided and the field narrowed by following the major clues offered by heredity, age incidence and obesity. Certainly if these unsuspecting victims can be found and the ideal of control brought into effect, the final outcome should be gratifying. It is perhaps time similar surveys were conducted in Australia to see if a like incidence exists; if it does the American idea might well be copied, and in particular Joslin's practical approach to it.

#### THE CONTACT LENS PROBLEM IN THE UNITED STATES.

THE history of contact lenses and some of the difficulties associated with their general use were considered in a leading article in this journal on June 14, 1947. Reference was made to an important contribution on the subject by D'Arcy Williams, and a brief review of the indications for their use and the possibilities of their abuse concluded with a plea that "the members of the public should be urged to seek expert advice before they yield to the pressure of advertising salesmen, however specious their arguments may appear". Apparently this potential danger has become an active one in the United States, and the American Committee on Optics and Visual Physiology, which is composed of ophthalmologists representative of four leading American bodies concerned with ophthalmology, has investigated the problem. The investigation forms the basis of a report by Conrad Berens.<sup>1</sup> A questionnaire was sent out to a large number of certified ophthalmologists, and the following information *inter alia* was obtained. Many ophthalmologists preferred to have technicians fit the lenses (to save their own time, some admitted), but an equal number believed that most of the bad results were due to fitting by unskilled technicians and that a patient should not be entrusted to a technician except under the direct supervision of the ophthalmologist; corneal abrasions, corneal ulcers and even loss of an eye were reported as due to clumsy technique. The opinion was expressed frequently that success in the fitting of contact lenses depended to a large degree on the motivation of the patient; those needing them for optical or occupational reasons are more likely to put up with minor discomfort than those interested only in cosmetic effects. Practically all agreed that the patients deriving the greatest benefit were those with keratoconus. Others reported success in cases of high astigmatism, aniridia and monocular aphakia, and with younger patients who had undergone cataract operations. The main complaints concerned the limited time for which most patients can tolerate the lenses, the unsatisfactory nature of the present solution used which allows fogging to develop too quickly, the high cost of lenses and the frequent dissatisfaction of patients who have bought and worn the lenses. Suggestions for improving the situation included the arrangement of better facilities for ophthalmologists to learn about contact lenses, the discouragement of patients from wearing them except for pathological conditions or for occupational reasons, and

the need for control of commercialism and exploitation by manufacturers. In general it was agreed that the whole subject of contact lenses was still in a research period. After due consideration of the matter, the American Committee on Optics and Visual Physiology has now made the following recommendations, which have been endorsed by its four participating societies:

1. National and local ophthalmologic societies should regulate the prescribing of contact lenses and the dissemination to the public of information regarding contact lenses.
2. The prescribing and/or the fitting of contact lenses by persons not properly licensed under state or national laws should be prohibited.
3. Medical opinion should be secured in every case before contact lenses are prescribed.
4. Ophthalmologists should establish standards for approving the fitness of technicians who wish to engage in fitting contact lenses.
5. Competent impartial research should be initiated toward the solution of unsolved problems concerning contact lenses. . . .
6. The public should be warned against those who advertise the superiority of their services or of any particular type of contact lenses. . . .

These recommendations might well be studied seriously not only by ophthalmologists but by all who are jealous for the standards of health and medical treatment in this country. There is little indication here of a situation such as that which apparently exists in the United States, but if it does arise we must not say that we have not been warned.

#### A NEW TREATMENT FOR FILARIASIS.

FILARIAL INFESTATION is of little practical concern to practitioners in most parts of Australia today. Even in Queensland, where the incidence of infestation with *Wuchereria bancrofti* was high in the early part of this century, it has become a rarity. However, the advent of a new drug apparently effective in treatment is of interest. The drug is 1-diethylcarbamyl-4-methylpiperazine, marketed as "Hetrazan" and "Banocide". F. Hawking and W. Laurie,<sup>1</sup> of the Filariasis Research Unit of the Medical Research Council, East Africa, have reported its effect in cases of infection with *Wuchereria bancrofti* and with *Onchocerca volvulus*. They found that it was very rapid and effective in removing microfilariae from the blood of patients infected with *Wuchereria bancrofti*, but it did not remove microfilariae from hydroceles when brought into contact with them by direct injection into the hydrocele and it had no direct toxic action on microfilariae *in vitro*. These observations support the hypothesis that the drug acts by sensitizing the microfilariae for phagocytosis by the reticulo-endothelial system, to which microfilariae in the blood-stream are exposed. Treatment of patients with onchocerciasis brought about removal of microfilariae from the skin, but it apparently did not kill the adult worms. Patients with *Wuchereria bancrofti* infection tolerated the drug well, but those with onchocerciasis suffered a severe allergic reaction in practically all cases. The investigation is still proceeding. In another paper, which appears in the same journal as that of Hawking and Laurie, F. Murgatroyd and A. W. Woodruff report the treatment with the drug of seventeen European patients with loiasis. Disappearance of microfilariae of *Loa loa* from the blood was brought about with death of adult worms. Side effects occurred in some, but not all, cases. All the patients except one had remained free from symptoms of loiasis for one to fourteen months since treatment, at the time the report was made; it was thought that the exception might have been due to reinfection. Murgatroyd and Woodruff conclude that "the findings suggest that the drug is a valuable filaricidal agent in loiasis", and it seems likely that it is of value for the other filarial infestations mentioned, especially that with *Wuchereria bancrofti*. It is to be hoped that further trial will show that this drug is effective and satisfactory in a field where specific therapy has been lacking.

<sup>1</sup> The Journal of the American Medical Association, June 18, 1949.

<sup>1</sup> The Lancet, July 23, 1949.

## Abstracts from Medical Literature.

### RADIOLOGY.

#### Hamartoma of the Lung.

W. C. HALL (*American Journal of Roentgenology*, November, 1948) describes hamartomata of the lung as tumour-like masses containing some or all of the normal histological elements which make up mature bronchi or lung tissue, although quantitatively grouped in abnormal proportions so that one tissue element predominates, usually cartilage. Most hamartomata of the lung are asymptomatic, and they are discovered either at autopsy or on routine chest X-ray examination, or when chest films are made for some other suspected disease, such as pneumonia. Dyspnoea and chronic cough may at times be present for years before the diagnosis is established. Hemoptysis and chest pain have been reported in a few instances. All age groups are involved, but the highest incidence occurs after the age of forty-five years. Both sexes are affected with equal frequency. The tendency of hamartomata of the lung to undergo calcification or ossification is of great importance to the radiologist. The presence of small calcifications scattered through a discrete, smooth-margined, round or lobulated mass which is surrounded by normal lung tissue is sufficiently unusual to suggest at once the possibility of hamartoma. Large hamartomata which contain calcium or bone can be diagnosed with reasonable accuracy from radiographs alone. Small lesions, which are of more common occurrence, are more likely to simulate metastatic nodules or primary bronchogenic carcinomata, and they cannot be diagnosed specifically from the radiograph.

#### The Skeletal Lesions in Leuchæmia.

F. N. SILVERMAN (*American Journal of Roentgenology*, June, 1948) reports the X-ray findings in the skeleton in 103 leuchæmic children. The radiological method was found especially valuable in the study of children who had anæmia, fever and pain in the extremities. The author states that the skeletal lesions and symptoms are less common in adults. The explanation most frequently offered for this has been that the marrow reserve in children is less than that in adults. The adult possesses large amounts of fatty marrow, which can be replaced by leuchæmic cells before osseous changes occur; the child, whose bones are completely filled with functioning red marrow, meets excess demands for medullary space by extramedullary hematopoiesis and by expansion of the marrow cavity. The destructive and productive changes seen radiographically in the bones of children with leuchæmia represent variations in the response of the bones to the intra-osseous proliferation of leuchæmic cells. Osteolytic lesions occurred in 39 patients. Both focal and diffuse destructive lesions were noted. Focal lesions were characterized by areas of radiolucency in the spongiosa. Some were sharply circumscribed, others had indefinite margins. An occasional lesion, seen in profile, demonstrated that internal erosion of the cortex also occurred. The "moth-eaten" appearance

of some bones probably resulted from destruction of both spongy and compact bone. Conglomerations of such lesions produced diffuse osteolysis in some cases. In others, extreme degrees of osteolysis occurred and resulted in fractures. The skull and pelvis were involved occasionally. Exaggeration of the normal diploic pattern could be seen in the skull, but owing to the great normal variation this feature was interpreted with difficulty. In the pelvis, a coarse reticulated pattern was more easily recognized as abnormal. Osteosclerosis was the least frequent of the four types of lesions; it was found in nine cases. Like osteolysis, it was either focal or diffuse. Osteosclerosis was more difficult to assess when it was found in association with lytic lesions because of contrast. Subperiosteal new bone formation was observed in 17 cases. This type of lesion was of great interest to earlier observers because of its supposed rarity, but the number of case reports presenting this finding indicates that it is one of the more frequent lesions in leuchæmia. It was second in frequency in this series, occurring in one-third of the cases. The cortical thickening it produces was seen in all the major long bones, less frequently in the ribs and the small tubular bones of the hands and feet, and rarely in the flat bones. Associated X-ray findings outside of the skeletal system which were often helpful in diagnosis were enlargement of the lymph glands, mediastinal tumours and enlargement of the adenoids. Soft tissue swellings in the neck and axilla were often observed as incidental findings in chest radiograms; mediastinal widening and leuchæmic proliferation in the lungs occurred much less frequently. Lateral projections of the neck occasionally demonstrated large lobulated soft-tissue shadows projecting into the naso-pharyngeal air column from the posterior pharyngeal wall in the position normally associated with the adenoids. None of these findings was specific for leuchæmia, but they suggested that a systemic disease was operative and that lymphatic structures were involved in a proliferative reaction.

#### Vertical Fracture of the Patella.

G. F. DOMMISSE AND M. H. FAINSLINGER (*British Journal of Radiology*, November, 1948) discuss the differential diagnosis of bipartite patella and vertical fracture. They state that the differential diagnosis can be made on clinical and radiological grounds with reasonable certainty. Bipartite patella is clinically recognizable by the presence of a painless, palpable nodule or prominence on the supero-lateral aspect of the superficial surface of the patella. In the presence of traumatic separation of the lesser fragment of bipartite patella, or of vertical fracture, this area is exquisitely tender. Recent fracture of the patella cannot be diagnosed in the absence of hemarthrosis, which will be present also after traumatic separation of the fragments of bipartite patella. The gap of a recent fracture is irregular but clearly defined. Trabeculae are seen to end blindly at the gap of a fracture, and on magnification the corresponding ends of the interrupted trabeculae can be detected. There is no fusion of adjacent trabeculae at the gap to form a subchondral line, as is the case with bipartite patella. The lateral projection is of value in that the lesser fragment of the bipartite patella can usually be

clearly seen towards the articular aspect of the upper pole, while no such separate fragment is seen in a vertical fracture without displacement. A bipartite patella shows a gap at the supero-lateral corner, causing a semi-lunar, concave notch in the larger fragment. A vertical fracture occurs in the lateral rather than in the supero-lateral portion of the patella, and the fracture line is less curved. The appearance of a bilateral lesion strongly favours the congenital anomaly. Bony union, radiologically demonstrated, is final and incontrovertible evidence of fracture.

#### The Linear Atelectatic Sign in Intraabdominal Lesions.

J. L. MARKS AND A. NATHAN (*Radiology*, March, 1949) call attention to the frequency of linear atelectasis in association with intraabdominal lesions. They state that its presence, although not pathognomonic, should immediately lead to suspicion of a pathological condition within the abdomen. Pathologically the atelectatic area is diskoid in shape, lying in more than one plane of the lung. The resulting X-ray appearance is that of either a single striation or multiple striations rather than a solitary area of homogeneous density. Frequently the striations extend from the cardiac border to the peripheral lung fields in a horizontal or oblique direction. When oblique, they radiate in a direction not parallel but rather perpendicular to the interstitial markings of the lower parts of the lung fields. The striations vary from thread-like lines to bands which may measure as much as half a centimetre in thickness. The majority, however, are of narrow calibre. Linear atelectasis is usually found in the lower third of the lung fields, either unilaterally or bilaterally. Most frequently it is seen immediately above the diaphragm. The latter structure is generally elevated and fluoroscopic examination reveals limitation of motion. Linear atelectasis must be differentiated from such lesions as interlobar pleuritis, healed pulmonary infarcts, and the residua of old destructive infections. Linear atelectasis, as opposed to interlobar pleuritis, does not correspond to the fissure levels. In lateral and oblique projections plate-like foci are roughly perpendicular to the longitudinal fissure. The shadows of infarcts are usually single and shorter than linear atelectatic areas and may take any direction in contrast to the constant horizontal character of this specific type of atelectasis. The infarct shadows persist, show no change on diaphragmatic movement, and may occur in any portion of the lung. Linear atelectasis is always secondary to some other lesion, either intrathoracic or intraabdominal. When these primary pathological conditions (intraabdominal lesions) produce shallow breathing as a result of diaphragmatic inflammation or elevation of the diaphragm, abnormal bronchial secretions may occur, with resultant plugging of a bronchus. When this happens in peripheral bronchi or bronchioles, linear atelectasis develops. Plate-like atelectatic foci occur in a horizontal direction because of the relative fixation of the mediastinum medially and the negative intrapleural pressure peripherally. This mechanism prevents vertical collapse in the presence of a small obstructed area. As the atelectasis occurs following bronchial or bronchiolar obstruction, the normally elastic



alveoli immediately above and below become emphysematous, so that the collapse is able to occur in a horizontal direction. In the past, diaphragmatic elevation has been utilized frequently as a sign of either an intrathoracic or an intraabdominal lesion. In many instances, the primary lesion has proved to be intrathoracic. The presence of linear atelectasis, however, either with or without a high diaphragm, affords presumptive evidence of disease within the abdomen.

#### Paraplegic Neuroarthropathy.

J. SOLOVAY AND H. U. SOLOVAY (*American Journal of Roentgenology*, April, 1949) state that neuropathic articular and periarticular changes occur in the lower extremities of paraplegics, constituting another example of the Charcot neuroarthropathy. In Charcot's joint, there may be intra-articular destructive and productive changes and also extraarticular soft tissue ossification—the hypertrophic variety; or there may be erosion and absorption of the articular extremities with relaxation of the capsule and ligaments—the atrophic variety. Peri-articular ossification may be massive or minimal in either type. In the paraplegic, periarticular ossification is the outstanding feature, and intraarticular destructive changes are minimal or absent, though occasionally striking. Transitions between the various forms of neuroarthropathy may occasionally be seen. The mechanism of the paraplegic neuroarthropathy is believed to be long-continued pressure over anesthetic bony prominences and lack of warning sensation, which are equivalent to trauma in initiating ossification in the periarticular tissues. The scarcity of intraarticular changes is attributed to lack of use of the paralysed joints.

#### PHYSICAL THERAPY.

##### Graves's Disease.

J. M. READ (*Radiology*, April, 1949) presents a report on 15 patients treated with Graves's disease twenty-five years ago. The group of patients all had typical thyrotoxicosis, none had previously undergone thyroidectomy and all received deep X-ray treatment during the course of the illness. The review was undertaken to correct, if possible, the general impression that irradiation of the thyroid was only palliative in its effect and rarely resulted in cure. In this group the initial basal metabolic rate varied from +23% to +112%. The irradiation was given at 130 kilovolts filtered through 0.25 millimetre of copper and 1.0 millimetre of aluminium. A dose of 200r was given weekly over each lobe and usually twelve treatments were given. In severe cases a shorter course was given in the following year. The patients received from three to 23 exposures, the dosage range varying from 600r to 6090r. The largest dose was given to the patient with the metabolic rate of 112%. This patient with one or two others suffered some telangiectases and atrophy of the skin in the treated area. Fourteen patients have been traced. Nine patients are living and well at ages from thirty-four to seventy-three years. Three are dead from other causes. One has undergone thyroidectomy with only

fair results and one patient is living (aged seventy-one years) with disease which is chronic. No ill effects of treatment were observed except the skin atrophy previously mentioned. Only one patient has hypothyroidism. She lives in an endemic goitre area and her basal metabolic rate has fallen gradually to -27% without signs of myxoedema.

#### Antihistamine Ointments for Skin Protection in Radiation Therapy.

M. PAUL MAINS (*Radiology*, April, 1949) states that it is generally agreed that in tissue damage following irradiation histamine or histamine-like substances are released from the cells. On this presumption the author has been giving "Benadryl" and "Pyribenzamine" by mouth (25 milligrammes by mouth after each meal). In a series of over 300 cases this has greatly reduced irradiation sickness. In addition, as it is known that "Benadryl" reduces the sensitivity of the skin to histamine, it was decided to try the local application of this drug. An ointment containing 5% "Benadryl" in the base "Aquaphor" was applied to the treated area directly after treatment and again at bedtime. Using 200 kilovolts filtered through 0.5 millimetre of copper plus one millimetre of aluminium, the authors found that skin reactions were materially lessened. The reactions following a dose of 2400r applied to the skin are now much less than was formerly observed with 1800r, and no appreciable atrophic changes occur. This method has been used in over 100 cases, and as well as a great increase in skin tolerance, there seems to be a lessened severity of bowel and bladder symptoms.

#### X-Ray Therapy of Carcinoma of the Skin of the Eyelids.

J. A. DEL REGATO (*Radiology*, April, 1949) states that carcinoma of the skin of the eyelids are usually diagnosed in a relatively early stage, but they may present serious therapeutic problems if the first form of treatment is inadequate. Treatment by radium and surgical excision are capable of producing good results, but the author considers that the functional and aesthetic results are by no means comparable to those obtained from X-ray therapy. These conclusions are based on a study of 180 cases. The author states that the majority of carcinoma in the region of the eyelid are basal-cell carcinomata and are easily diagnosed, although senile papillary lesions may sometimes cause confusion. The aim of treatment is to control the tumour, a good cosmetic result being obtained and the vision not being affected. Cauterization, incomplete excision and inadequate radiotherapy end in the necessity for radical treatment. The author considers that simple excision is rarely suitable for treatment of these lesions. If the excision is wide enough, closing and healing of the wound often result in ectropion, chronic lachrymation *et cetera*. Better results are obtained by means of excision and grafting. Extensive surgical procedures with enucleation of the eye may be necessary in advanced cases. Interstitial radium therapy has many limitations. It is useful only for small lesions, and no effective way exists of shielding the eye from  $\gamma$  rays. Treatment by X rays is usually the method of choice. An eye shield is used in all cases. Small

lesions may be treated over a few days, but for large lesions fractionation over about three weeks is advised and daily treatment should be given if possible. The author recommends a total dose of 4000r to 5000r given over three weeks. With a shorter treatment time the dose is smaller, but never less than 3000r. This dose is sufficient to cause moist desquamation, and it is important to care for the reaction carefully. Infection will lead to fibrosis and delay healing with impairment of the cosmetic result. The results of treatment are given, including complications following treatment. No case of cataract had developed among the patients treated with X rays.

#### Intravaginal X-Ray Therapy for Cancer of the Cervix Uteri.

G. H. TWOMBLY AND J. A. CHAMBERLIN (*Radiology*, January, 1949) analyse the methods of treatment of carcinoma of the cervix used at the Memorial Hospital. Treatment has been mainly by radium and X rays. From 1918 to 1931 treatment was by intracavitary application of radium combined with external irradiation, first by the radium bomb, and in later years by low voltage X rays. Of the patients treated by this method, 22.5% were free of cancer for five years. The method was then altered in that external irradiation was given at a voltage of 200 kilovolts and the five-year survival rate rose to 27.7%. A divided dose technique for the external irradiation replaced the massive dose technique and the five-year survival rate rose to 35.4%. In 1943 it was decided to substitute other methods of treatment for local application of radium to the cervix, the method of external irradiation to remain constant. The patients with carcinoma of the cervix at the Memorial Hospital were divided into two groups. Each group received external irradiation by X rays and 3000 millicurie-hours of radium in a cervical applicator. Group B received in addition approximately 3000 millicurie-hours from parametrically applied radon needles. Group A received X-ray therapy through special vaginal cones. After two years it was found that the needle insertion technique was a dangerous and ineffective method, and it was abandoned. The patients in group A who have been treated over three years have been followed up. The method of intravaginal X-ray therapy depends mainly on the use of special cones with a diameter up to four centimetres. The cervix is treated with four doses of 500r. The fornices are then treated with four doses of 750r each. Efforts are made to avoid overlapping by careful visual application of the fields. Treatment was given usually three times weekly, simultaneously with the external irradiation and followed by intracervical radium application. The usual factors at first were a voltage of 120 kilovolts filtered through three millimetres of aluminium, but it is becoming the practice now to use the high-voltage machine whenever practicable. It is claimed that by this method the parametrial tissues and pelvic lymph glands are effectively irradiated, and bladder or rectal damage is not common. The results over three years show that 36.5% of patients are alive and free from malignant disease. A suggestion is made that in further cases the use of intracervical radium therapy will be discontinued and intracavitary irradiation will be given with X rays alone.

## British Medical Association News.

### SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Royal North Shore Hospital of Sydney, Crow's Nest, New South Wales, on June 23, 1949. The meeting took the form of a series of clinical demonstrations by the members of the honorary medical and surgical staffs of the hospital. Part of this report appeared in the issue of September 3, 1949.

#### Hydatid Cyst of the Liver.

DR. L. S. LOEWENTHAL presented a female patient, aged thirty-seven years, who had been admitted to hospital on May 15, 1949, with a history of upper abdominal pain and nausea of four days' duration, and a "fainting attack" shortly before her admission to hospital. Eighteen months previously a hydatid cyst of the liver had been discovered during a pregnancy. Her menstrual history was normal, and the last menstrual period was stated to have occurred on April 20, 1949. On her admission to hospital she was breathless, cyanosed, shocked and complaining of generalized abdominal pain and tenderness. Her temperature was 97° F. Generalized abdominal tenderness was present, but no rigidity, and an obvious spherical tumour was palpable in the right hypochondrium. Intravenous therapy with glucose and saline was given, and by the next day she was well, apart from tenderness in the right hypochondrium and the right loin. That night she had a rigor, her temperature rose, and on the following day it reached 105° F., with continued rigors and sweating. Penicillin was administered. On May 18 she passed a ten-week fetus *per vaginam*. Serum, blood and "Percorten" were administered. On May 20 numerous pus cells and *Bacillus coli communis* were found in the urine, and she was given sulphadiazine and alkalis. The placenta was removed with ovum forceps. By May 26 the pyrexia had almost subsided, the urine was clear, there was no hemorrhage or discharge *per vaginam*, and her serum protein content had risen to 6.0 grammes *per centum* from a level of 4.7 grammes *per centum* eight days previously. The treatment with penicillin and sulphadiazine was suspended, and the patient at the time of the meeting was well. Her blood pressure, which had been low throughout the course of her illness, was still only 80 millimetres of mercury, systolic, and 60 millimetres, diastolic.

#### Massive Gastric Hæmorrhage.

Dr. Loewenthal then presented a woman, aged forty-eight years, who had been admitted to hospital with a history of epigastric pain after meals of three months' duration, and hæmatemesis prior to her admission to hospital. Shortly after her admission she vomited twelve ounces of bright red blood. She was pale and suffering from shock. A transfusion of two litres of blood was given, and her condition settled down. Four days after her admission to hospital, she suddenly vomited thirty ounces of red blood and became unconscious. Her condition slowly improved with the administration of blood and serum, and between two and three hours after the hæmatemesis laparotomy was performed. The stomach was distended with blood, and gastrotomy revealed a posterior penetrating ulcer adherent to the pancreas, with hæmorrhage from the splenic artery in the base of the ulcer. The splenic artery was oversewn and the stomach was closed. A further two litres of blood were given, and continuous gastric suction and intravenous glucose and saline therapy were maintained for four days. She had a slow convalescence, during which she developed bronchopneumonia which responded to chemotherapy, and passed bright blood *per rectum*, which was probably due to the presence of hard feces in the rectum.

#### Parotid Tumours.

Dr. Loewenthal then presented two elderly women with parotid tumours. One patient had had a lump in front of the right ear removed under local anaesthesia eight years previously. The lump had recurred, and examination revealed a hard, smooth tumour beneath the old operation scar. The facial nerve was not involved. The other patient had noticed a lump on the right cheek eighteen months previously, and it had been discharging for seven months. Examination of a biopsy specimen had revealed no evidence of malignancy. A freely movable cystic swelling was present over the angle of the right mandible. No glands were palpable.

#### Carcinoma of the Head of the Pancreas.

Dr. Loewenthal's last patient had been admitted to hospital with a history of pain in the left hypochondrium and epigastrum of six weeks' duration, increasing jaundice of five weeks' duration, and nausea, anorexia and vomiting of six weeks' duration. His feces were pale and his urine was dark. He had lost ten pounds in weight in two months. On examination, the patient was deeply jaundiced, with slight epigastric tenderness. No abdominal masses were felt. The results of liver function tests were in keeping with a diagnosis of obstructive jaundice. Before operation he was given two litres of blood, one litre of serum, a diet of high protein content, and vitamin K. Laparotomy revealed a large, hard growth two inches in diameter arising from the head of the pancreas. The liver and gall-bladder were enlarged. There was evidence of considerable portal obstruction, but no sign of metastases. Cholecystojejunostomy was performed. The post-operative course was satisfactory. By the time of the meeting the jaundice had almost disappeared, the feces were of normal colour, the wound had healed and the patient felt well, except for occasional pain in the left hypochondrium.

#### Œsophagectomy for Œsophageal Obstruction.

DR. ERIC GOULSTON presented a female patient, aged seventy-six years, who, when admitted to hospital, had a three months' history of inability to swallow food, regurgitation of solid food, constipation, and a loss in weight of two stone. Physical examination revealed changes characteristic of senility and of weight loss. A provisional diagnosis of carcinoma of the œsophagus was made, and this was supported by X-ray examination after a barium bolus and by œsophagoscopy. Biopsy was not performed during œsophagoscopy, as the lesion bled freely, but an irregular constriction was present at the lower end of the œsophagus, and its appearance was highly suggestive of carcinoma. After full investigation and intensive pre-operative preparation, œsophagectomy was carried out by the abdominal approach, being followed by œsophago-gastrostomy. The œsophagus was seen to be involved by an apparently neoplastic process for about two inches at a height of about one inch above the cardio-œsophageal junction. Convalescence was accompanied by a good deal of physical and mental upset. The patient eventually recovered and was discharged from hospital five weeks after operation. Microscopic examination of the material removed at operation failed to reveal any evidence of neoplastic tissue in the œsophagus, or of tumour cells in a small neighbouring lymph node. A chronic inflammatory condition was found, with an increase of fibrous tissue.

#### Carcinoma of the Colon.

DR. C. H. W. LAWES presented a man, aged seventy-three years, who had reported at the out-patient department in December, 1948, with a history of hæmorrhage *per rectum* on and off for six years, and worse for the past six months with severe diarrhoea. Sigmoidoscopic examination revealed the presence of blood in the rectum, but no obvious growth up to a distance of 15 centimetres. X-ray examination after a barium enema revealed a filling defect of the lower end of the pelvic colon. After preparation with phthalylsulphathiazole, caecostomy of the "ink-bottle" type was performed. Liquid paraffin, a diet of high protein content, and a blood transfusion of one litre were then prescribed. A fortnight after the caecostomy, the sigmoid colon was resected with two fungating masses, and end-to-end anastomosis was performed. Convalescence was uneventful.

#### Lacerated Wrist with Tendon and Nerve Injury.

DR. T. F. ROSE presented a man, aged twenty-three years, who had cut his right wrist with glass on April 2, 1949, and had reported to the casualty department half an hour after the injury. On examination of the patient, a clean cut was found, and the following structures were severed: the tendons of the *palmaris longus*, the *flexor carpi radialis*, the *flexor digitorum sublimis*, and the *flexor pollicis longus*, the median nerve, and the radial and ulnar arteries. The index tendon of the *flexor digitorum profundus* was partially cut. All the tendons with the exception of that of the *palmaris longus* were sutured with stout black silk, the median nerve was sutured with chromicized catgut, and the radial and ulnar arteries were ligated. A plaster of Paris back slab was applied, with the wrist in flexion. Penicillin was administered, and the wound was redressed in the operating theatre one week later. Physiotherapy was started one month after operation, and the patient was progressing satisfactorily.

### Compound Fracture of the Tibia and Fibula.

Dr. Rose then presented two young men who had sustained compound fractures of the tibia and fibula as the result of road accidents. In one case the fracture had been plated and a long leg plaster applied and left for nine months. At the end of that time X-ray examination revealed little apparent union of the tibia, but some union of the fibula. As the plaster cast was causing dermatitis, a walking caliper was applied. Four months later there was still no sign of union, and it was proposed to remove the plate and sclerotic bone and to carry out a chip bone grafting procedure from the ilium. The other patient had suffered extensive laceration of soft tissue with a large area of skin loss. The tibia, after reduction of the fracture, was fixed with two vitallium wires. The skin on the medial side of the calf was mobilized and the fracture site was covered with skin. The skin was held by three wire ties to the tibia over the upper part of the wound, its edges were drawn together with catgut sutures, and the rest of the wound was left open. A plaster cast was applied. Three months later a sequestrum was removed, a gap being left between the fragments. No bony or fibrous union occurred. A tube pedicle graft was later transferred from the abdomen to the leg via the wrist, and a chip cancellous bone graft from the ilium was inserted between the ends of the tibial fragments after removal of fibrous tissue and the chiselling away of sclerosed bone.

### Subacute Obstruction of the Large Intestine.

Dr. Rose's next patient was a woman, aged fifty-four years, who had been admitted to hospital with a complaint of increasingly severe abdominal pain and distension of five days' duration, with complete constipation. Anorexia and nausea were severe, but the patient had vomited only once, on the day of her admission to hospital. A diagnosis of large bowel obstruction was made. At laparotomy the whole of the large intestine from caecum to anus was found to be enormously ballooned. No mechanical cause of obstruction was found. A rectal tube was passed with little effect, but some flatus was passed through a sigmoidoscope. Finally manual compression was used to deflate the bowel through the sigmoidoscope. The patient made a satisfactory recovery, the bowels acting normally on the third day after operation. The cause of the obstruction was thought to be neurogenic.

### Acute Tuberculous Appendicitis.

Dr. Rose's last patient was a man, aged nineteen years, who had suffered from attacks of circumumbilical pain for six months before he was admitted to hospital with acute appendicitis. At operation the appendix was found to be covered with adhesions, greatly thickened and perforated at the base. Microscopic examination showed it to be tuberculous. An appendiceal abscess formed and was drained, streptomycin was given for twenty-one days, and the patient made a good recovery, the sinus in the wound healing in one month. Investigations failed to demonstrate the presence of tuberculosis in any other organ. About the time of the meeting, eight months after the appendectomy, the patient was well, and the wound was normal in appearance.

### Thoraco-Lumbar Sympathectomy for Hypertension.

Dr. E. F. LANGLEY presented two patients who had undergone thoraco-lumbar sympathectomy for the treatment of hypertension. The first patient, a man, aged forty-three years, had for twelve months been suffering from occipital headaches and awareness of his "heart beating in the ears". The symptoms were relieved by rest and medical treatment, only to return when he resumed his normal occupation. He was an introspective man, but in no apparent distress when examined. His blood pressure was 195 millimetres of mercury, systolic, and 105 millimetres, diastolic. Examination of the ocular fundi revealed a copper wire appearance of the arteries and nipping of the veins at the arterio-venous junctions. X-ray examination of the chest revealed considerable cardiac enlargement, mainly ventricular, and an electrocardiogram contained evidence of coronary artery sclerosis and left ventricular preponderance. The "Sodium Amytal" test resulted in a drop in the blood pressure from 200 to 164 millimetres of mercury, systolic, and from 110 to 72 millimetres, diastolic, after nine grains had been given in three equally divided doses. In view of these investigations sympathectomy was deemed advisable. The greater and lesser splanchnic nerves were divided on the left side, and the sympathetic ganglia from the eighth thoracic to the fourth lumbar were removed. During the operation the pleura was torn, and attempts to suture it were unsuccessful. On the day after operation the blood pressure was 150 millimetres of mercury, systolic, and 96 millimetres, diastolic, and the base of the left lung was

collapsed. A small amount of fluid formed in the left pleural cavity, but this was absorbed and the lung expanded to normal. Three weeks after the operation on the left side, the blood pressure being 192 millimetres of mercury, systolic, and 120 millimetres, diastolic, sympathectomy was performed on the right side. A cannula had been inserted in the left long saphenous vein before operation as a precaution against shock, and when the systolic blood pressure fell to 80 millimetres of mercury and the patient became shocked, the condition was treated with ease by the intravenous administration of serum. The blood pressure gradually rose to 160 millimetres of mercury, systolic, and 110 millimetres, diastolic, about a fortnight after the operation. The patient's only complaint at that stage was of dizziness when he stood still, a condition which was not relieved by the bandaging of both lower extremities.

The second patient had suffered from dyspnoea on exertion and from dizziness for six months, with at times numbness of the left arm and leg. His blood pressure was 200 millimetres of mercury, systolic, and 140 millimetres, diastolic. X-ray examination revealed slight cardiac enlargement which was not apparent clinically. Examination of the ocular fundi revealed retinal arteriosclerosis, but no oedema, hemorrhages or exudate. A little response followed the "Sodium Amytal" test. The electrocardiogram contained evidence of myocardial degeneration due to coronary damage and left ventricular preponderance. Thoraco-lumbar sympathectomy was performed first on the right side, the sympathetic chain and splanchnic nerves from the eighth thoracic to the first lumbar level being found and removed. The blood pressure subsequently fell to 115 millimetres of mercury, systolic, and 80 millimetres, diastolic. Convalescence was uneventful, and a fortnight after operation the blood pressure had risen to 140 millimetres of mercury, systolic, and 100 millimetres, diastolic. Nearly two months after the first operation the procedure was repeated on the left side, and after an uneventful convalescence the patient was discharged from hospital with a blood pressure of 125 millimetres of mercury, systolic, and 95 millimetres, diastolic.

### Plastic Surgery.

Dr. BASIL RILEY showed several patients to demonstrate the application of plastic surgery. The first group had suffered loss of the major portion of the nose as a result of trauma. The first of the group, a boy, aged fifteen years, had been involved in a cycle accident; the loss was remedied by means of a local flap used for reconstruction of the entire tip of the nose and two-thirds of the right alar margin. The second patient, a child, aged seven years, had lost the entire tip of the left ala and portion of the right ala as a result of a dog bite; reconstruction was carried out by means of a forehead flap. The third patient, a child, aged ten years, had had the nose bitten off in infancy by a magpie; the repair was carried out by means of a tube pedicle graft from the inner aspect of the left arm. The fourth patient, a child, aged eight years, had suffered the loss as the result of a fall; the tip of the nose and ala were reconstructed by means of local flaps.

Dr. Riley then presented two adult female patients who had been suffering from rhinophyma as the result of gross acne, to illustrate the application of thick split skin grafts after extensive excision of the hypertrophic tissue.

Dr. Riley's next demonstration was of the Forrest-Young technique for the correction of the congenital deformity known as bat ears. As in the other cases, the pre-operative and post-operative conditions as well as the operative technique were illustrated with photographs.

The last demonstration presented by Dr. Riley was of the McIndoe technique of mammaplasty for hypertrophied breasts.

### Cervical Fibromyoma.

Dr. ANGUS MURRAY presented a woman, aged seventy-four years, who two years previously had been found to have a large tumour practically filling the pelvis and not giving rise to symptoms. Recently the patient had complained of pain and twitching in both legs, and her doctor considered that the tumour had increased in size and was softer in consistency than formerly. When she was examined by Dr. Murray in consultation, a large tumour of varying consistency was found filling the pelvic cavity; a small, soft cervix uteri was displaced anteriorly and upwards. At operation a large cervical fibroid tumour was removed, which had practically obliterated the uterine cavity. The pathologist, Dr. Colin Graham, had reported that the tumour was "a large cervical fibroid 14 cm. in the long axis of the cervix and 11 cm. in its shortest diameter". Microscopic examination showed that the tumour was a fibromyoma in which there was extensive hyaline and myxomatous degeneration. No malignant changes were seen.



### Fibromyoma of Right Broad Ligament.

Dr. Murray's second patient, a married woman, aged thirty-nine years, had stated that she had a lump in the abdomen evident for about four months. She had had four normal confinements and no operations. A fibromyoma was removed through an incision in the anterior leaf of the right broad ligament. It was attached to the right side of the body of the uterus, and was found to weigh four pounds.

### Carcinoma of the Body of the Uterus with Multiple Fibroid Tumours.

Dr. Murray's last patient, a married woman, aged sixty-two years, had suffered from aching pain in the abdomen with hemorrhage and a discharge *per vaginam* for six months. She had no children, and the menopause had occurred ten years previously. She had had no operations before her present illness. Curettage of the uterus had been performed in the country two months before her admission to the Royal North Shore Hospital. Pathological examination of the endometrium had revealed no abnormality. As hemorrhage persisted, the patient was sent to Sydney and panhysterectomy was performed. Carcinoma of the body of the uterus was found with multiple fibroid tumours. On examination of the specimen it became obvious why the curette had missed the area of carcinoma, as it was tucked away in one cornu behind a large fibromyoma projecting into the uterine cavity. Microscopic examination revealed that the newgrowth was adenocarcinoma. Dr. Murray remarked that the case illustrated a typical diagnostic trap.

### Multiple Fibromyomata Uteri.

Dr. O. ROBERTSON presented a patient who had suffered for two years with pain in the right side and had lost three stone in weight in the past three months. Her menstrual history was normal. An abdominal examination revealed three round masses, movable and not tender, in the lower part of the abdomen. Multiple fibroid tumours were palpable *per vaginam*, two being apparently cervical. At operation multiple pedunculated fibroid tumours were found, with chronic inflammation of the adnexa. Total hysterectomy was carried out, with right salpingo-oophorectomy and left salpingectomy.

### Uterus Didelphys.

Dr. STUART STUDDY and Dr. ALEXANDER OWEN demonstrated X-ray films prepared from a married woman, aged thirty years, who had had two miscarriages at two and four months of gestation respectively. She attended the sterility clinic at the Royal North Shore Hospital in December, 1947, and a salpingogram was prepared which revealed the condition of *uterus didelphys*. About May, 1948, the patient became pregnant and was given oestrogen for the first five months of her pregnancy. In January, 1949, she was delivered of a normal living male child, weighing six pounds four ounces.

### Thrombosis of Pelvic Veins.

Dr. EDMUND COLLINS presented a married woman, aged thirty-six years, who had been admitted to hospital with the history that, twenty-four hours previously, she had collapsed on the floor, temporarily losing consciousness. She went to bed, and shortly afterwards hemorrhage commenced *per vaginam*. Twelve hours later she developed pain low down in both iliac fossae. She had not passed urine for twenty-four hours before her admission to hospital, and catheterization of her bladder produced only about five millilitres of dark urine. Her last menstrual period had occurred about five weeks previously. She had had three children, no miscarriages and no surgical operations. On examination, the patient was pale and suffering from spasmodic pain. Tenderness and guarding were present in both iliac fossae and in the hypogastrium. Vaginal examination revealed extreme tenderness in the fornices. On the day after her admission to hospital the patient's condition had not improved, and she had passed only a very small amount of urine. Laparotomy revealed widespread pelvic thrombosis, a large "boggy" uterus containing blood clots, and gangrene of the left Fallopian tube and ovary. Subtotal hysterectomy and left salpingo-oophorectomy were performed. Penicillin, gas-gangrene antiserum and sulphadiazine were given after operation. The anuria persisted, and it was decided to attempt intestinal dialysis with two Miller-Abbott tubes. X-ray examination revealed one tube well down in the small intestine and one in the duodenum, but the apparatus could not be made to work. Spontaneous diuresis occurred on the eighth day after operation. Recovery otherwise was uneventful. Microscopic examination of a section from the uterus revealed placental remains, including fetal villi from an early pregnancy. Examination of sections of the ovary

and Fallopian tube showed them to be necrotic and infiltrated with blood, so that normal tissue structure could not be made out. The appearance was similar to that seen in ovarian tumours with a twisted pedicle, and could possibly have been the result of an infarct of a few days' standing.

### Chronic Mastoiditis.

Dr. A. L. CLOWES presented a man, aged fifty-two years, who had the history that, thirty-eight years previously, a piece of red-hot metal had lodged in the external auditory canal of the right ear. The piece of metal was removed after some hours, and later a discharging wound developed. About six plastic operations and one skin grafting operation were performed to keep the external auditory meatus open. Wax used to gather in large pieces, and over the years at intervals a slight yellow discharge would appear for two or three days at a time. In March, 1948, the patient noticed a large swelling on the right side of the neck. This swelling broke down and left a fistula approximately one inch below the tip of the right mastoid going into the soft tissues for about one inch. At the time pus was coming through a small central perforation of the right ear drum. A provisional diagnosis was made of chronic mastoiditis. At operation the usual mastoid incision was prolonged downwards to include the fistula, which was found to lead to a large cavity full of pus and cholesteatomatous material, and replacing the entire tip of the mastoid. The bone covering the lateral sinus had been destroyed and was replaced by firm scar tissue. The routine conservative radical mastoid operation was completed, and the posterior wound subsequently healed. At a later date a plastic operation was performed to enlarge the external auditory meatus and to provide access to the unusually large mastoid cavity. Dr. Clowes commented that it was possible that infection had been carried into the tip of the mastoid from the original foreign body, or that the infection might have occurred in the usual way, through the middle ear.

### Otosclerosis.

Dr. A. E. KHAN presented a woman, aged thirty-five years, who had undergone the fenestration operation on the left labyrinth for the treatment of otosclerosis. She had had deafness for fourteen years, more severe on the left side than on the right, and gradually increasing in severity. Tinnitus occurred at times, but no paracusis, and there was no history of discharge from the ear or of trauma. The patient's mother had been deaf, and an uncle was deaf and dumb. Dr. Kahn demonstrated audiograms prepared before and after the operation.

### Parkinsonism Accompanied by Acute Glaucoma.

Dr. K. B. ARMSTRONG presented a woman, aged fifty-six years, who, when admitted to hospital, had had red, painful eyes for five months. Both eyes had been treated with penicillin drops, with negligible effect. Four weeks before her admission to hospital an exacerbation occurred, and since then vision had begun to deteriorate. Atropine drops were instilled by the medical attendant, but were discontinued ten days before the patient was admitted to hospital. The patient had been admitted to the Royal Prince Alfred Hospital in 1943 with hemiplegia, and after a ventriculogram and an encephalogram had been prepared, a diagnosis of cerebral thrombo-phlebitis was made. Since that time the patient had been an invalid, having total quadriplegia, and when admitted to the Royal North Shore Hospital she presented a picture of advanced Parkinsonism. Both eyes were intensely red, the pupils were large and inactive with cloudiness of the iris, and the tension was high in both eyes. No conjunctival discharge and no keratic precipitates were apparent. Bilateral paracentesis of the anterior chambers was performed, and "Sulphatriad", penicillin and salicylates were administered systemically. Eserine and penicillin drops were instilled into both eyes every hour, and heat was applied every two hours. The eyes showed little response, and vision continued to deteriorate. A broad iridectomy performed on the right eye was successful in controlling the tension; but for the left eye repeated paracenteses were necessary. The eyes remained intensely red, and no improvement followed protein shock therapy. Tonsillectomy was then performed under "Pentothal" anesthesia with curare. The patient recovered satisfactorily, and three days later the eyes began to show improvement. About the same time, and also one week later, the patient developed a laryngeal crisis, becoming dyspnoeic and deeply cyanosed; but the attack resolved itself spontaneously in a few minutes. Repeated paracenteses were still necessary to control the tension in the right eye; but eventually, when the eye had become whiter, a broad iridectomy was performed, which was successful in controlling the tension. Dr. Armstrong

said that, although the eyes were still somewhat inflamed, a measure of safety appeared to have been achieved in both. The patient was able to count fingers and to see patients on the other side of the ward. Dr. Armstrong remarked that it was interesting to note the effect of the curare used with the anaesthesia on the Parkinsonian condition. After the operation the patient was able to move both arms through a fair range of movements. An attempt had been made to preserve the effect by the injection every four days of 30 milligrammes of "Tubarine" in oil; but at the time of the meeting only slight improvement remained.

#### Squamous Carcinoma of the Nose.

DR. HAROLD HAM presented a male patient, aged sixty-nine years, who had reported to hospital with a history that, three months previously, he had noticed a small pimple below the left nostril. The lesion increased in size and was extremely painful. He was found to have a raised, inflamed, slightly indurated area involving both nostrils and extending underneath the upper lip into the mouth. There was a sinus joining the left nostril to the mouth with an ulcerated area in the mouth at the junction of the upper lip and alveolus. Examination of a biopsy specimen revealed squamous-celled carcinoma. No bony changes were seen on X-ray examination. Lymph glands in the submaxillary triangle were palpable. Radiotherapy was used, a dose of 3500r being applied to each of two fields.

### Special Correspondence.

#### LONDON LETTER.

##### By OUR SPECIAL REPRESENTATIVE.

#### "Suit the Action to the Word."

THE translation of the broad and sometimes vague generalizations of an Act of Parliament into the every-day sphere of practical politics is a slow and at times a provocative process. Unforeseen difficulties crop up and contingencies arise for which no provision has been made. This broad statement applies in full force to a scheme like the *National Health Service Act* which involves, in some way or other, practically the whole of the medical and dental professions and their ancillary services, and also has repercussions on over 98% of the non-medical population. Some of the disputed points are settled by discussion and some even reach the courts. As an example of the latter class the following may be quoted. By a will signed on June 18, 1948, a certain share of an estate was left to the Royal Cancer Hospital and another, and equal share, to the Cancer Research Institute. Both these institutions were charities at the time the testator died on June 23, but the will was not proved till after the *National Health Service Act* came into force on July 5 last year. The two institutions mentioned are closely connected and interwoven in practice, but under *National Health Service*, the Cancer Hospital is classed as a hospital while the Research Institute is not and so comes under a different set of regulations. The question therefore arose whether the share earmarked for the Research Institute should be paid to the Royal Cancer Hospital, to the Minister of Health, or be withheld altogether. In his comments, the learned judge was even more scathing about certain provisions, or lack of provisions, in the Act than the most diehard doctor had ever been and described the particular clauses with which he had to deal as a "miracle of ineptitude". The problem was finally handed over to the Attorney-General to produce a scheme for consideration by the court. This is a test case and the final decision will influence a number of similar ones. So much on the legal side. From the medical standpoint two important matters, which are discussed below, have recently reached a stage which suggests finality: one deals with arbitration and the other tries to find a satisfactory way to answer the question as to who is and who is not a specialist.

#### "Sign, Please."

After prolonged discussion and the introduction of an amending bill in Parliament some major points still remained unsettled between the Minister of Health and the Joint Committee which represents the consultants and specialists (*THE MEDICAL JOURNAL OF AUSTRALIA*, April 9, 1949, page 506). Perhaps the most important difference of opinion was over the provision of machinery for arbitration, especially on terms of service, which includes remuneration. The reason

why doctors attach so much importance to this subject is that it has not arisen in any other nationalized undertaking. In the cases of coal, gas, electricity, and the railways, control lies in the hands of an independent board which settles the terms of service. In addition these industries have had Whitley councils for years, which are voluntary, and behind these councils there is an established negotiating and appeal machinery available if the decision of the Whitley council is not acceptable to both sides. In *National Health Service* control rests with the Minister and no independent negotiating body exists; his word, therefore, is final. The boards also derive an income from the industries they control, out of which their employees are paid. The medical profession gives service only and brings no direct monetary gain to the nation's exchequer. In earlier discussions the representatives of the profession, both consultants and general practitioners, had formed the impression that they would have the right to demand arbitration on terms of service, whether the Minister consented or not, and that the result of such arbitration would be binding on both sides. If words mean what they are generally thought to mean it would seem that this view was well founded. However, when the amending bill was introduced, it was found that arbitration was not to be compulsory, but merely optional and dependent on the consent of the Minister. In view of this the Joint Committee advised consultants and specialists not to sign permanent contracts till the position was clarified. Sir Lionel Whitby, Chairman of the Joint Committee and Past President of the British Medical Association, carried the matter a step further in a letter to *The Times* (June 20, 1949) and asked why the Government was intending to treat professional workers less fairly than other workers. "Now that so much of industry is nationalized and the medical profession also, the Government has lost its function as a balancing mechanism between two sides in a dispute, as it now becomes a party in disputes in nationalized industries and professions" (*British Medical Journal*, July 9, 1949, page 63). In the House of Commons the Minister stated: "If both sides agree to go to arbitration, obviously the Minister would accept the consequences." He would not consent, however, to compulsory arbitration as he regarded it as unconstitutional, in that Parliament would then lose "the power to consider the fiscal consequences of an arbitration". (This brings up again the vital point raised in a previous report that where the Government is paymaster financial control rests with the Chancellor of the Exchequer and not with the Minister of Health.) Speakers on both sides of the House of Commons agreed with the constitutional point set out by the Minister, but it was stressed that the medical profession was placed at a disadvantage as compared with other organized bodies of workers, as it had declared that under no circumstances would its members strike. A rather unpleasant turn was given to the discussion between the Joint Committee and the Ministry by a veiled threat in a letter from the latter hinting that unless matters were adjusted soon the terms and conditions of service might not be made retrospective. This question of arbitration was discussed at the Annual Representative Meeting of the British Medical Association, held recently at Harrogate, when it was unanimously decided that "effective action be taken forthwith to insist that arbitration machinery (including arbitration for resolution of disputes involving finance) be set up and that demands for arbitration by the profession shall not be subject to the Minister's veto". Negotiations continued between the Joint Committee and the Ministry and the *British Medical Journal*, July 23, 1949, page 53, supplement, reports that the latter has agreed:

- (a) That no changes will be made in the terms and conditions of service without discussion in the appropriate part of the Whitley machinery, when established, and this will be established as soon as possible.
- (b) That remuneration is a subject which is suitable for arbitration.
- (c) That save in exceptional circumstances, and after the conciliation machinery of Whitley has been exhausted, issues of remuneration remaining in dispute will go either to arbitration or for inquiry and report by a committee.

The Joint Committee has accepted this compromise and feels that it is now able to advise hospital staffs to enter into permanent contracts. How this will be received by the general body of consultants and specialists remains to be seen, but it does appear to be a reasonable and workable compromise. Of course, much depends on the interpretation put on the words "save in exceptional circumstances".

A *Times* leader sums up the position as follows: "Common sense has prevailed, and the main objective now should be to get the appropriate permanent negotiating machinery

established as soon as possible. This is essential for these consultants and specialists as well as other sections of the medical profession affected by a decision on arbitration . . . the governing factor is largely a matter of confidence. If the negotiating machinery is satisfactory the question of appeal will scarcely arise. The careful wording of the paragraphs on arbitration . . . should serve to restore the feeling of confidence which has, unfortunately, been lacking." In fairness it should be pointed out that the profession has been urging for months the establishment of the negotiating machinery which the leader-writer mentions. Doctors also feel that many of the Minister's past utterances and actions have not been such as to engender a feeling of confidence on their part.

The statement of the Ministry was reported to the General Medical Services Committee (which represents the general practitioners) at a recent meeting, and after careful consideration it was decided that: (a) the statement went a long way to meet the needs of the situation and that (b) no further action be taken on the resolution passed by the Annual Representative Meeting (set out above) till it is seen how the proposal of the Ministry works out.

The sooner the Ministry can implement its promise the better it will be for all concerned.

### "On His Choice Depends the . . . Health of the Whole State."

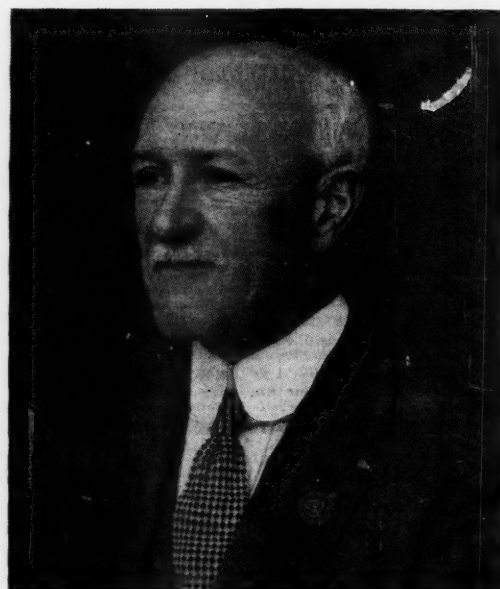
Under the National Health Service specialists are placed in various groups, according to their qualifications and experience and the work they are called on to do; the rate of pay varies according to the grade. Such grading is carried out by a medical committee, known as the Assessment Committee, consisting of two general physicians, two general surgeons, one obstetrician (who are working or who have worked in the area), with the addition of two specialists in the branch of medicine practised by the doctor to be graded; one of these two specialists is nominated by the university in the region. Each of the nineteen regions has its own committee. It is further laid down that "a proper assessment can be arrived at only after consideration by the professional advisers of the qualifications and experience of each practitioner". In the case of the general-practitioner specialists, post-graduate qualifications are not to be the sole judge of ability, but the decision in his case "must take account of experience which may of itself suffice to warrant acceptance as a specialist". Specialists dissatisfied with their grading have a right of appeal to the Assessment Committee which for the hearing of the appeal is strengthened by the addition of two other members. Many doctors feel that it would be wiser to grade the post which a specialist is to fill rather than the specialist himself, and then "only those men should be appointed to such posts who fulfil the necessary criteria and if suitable candidates cannot be found such posts should not be filled" (*British Medical Journal*, July 23, 1949, page 220). Results of this grading have been recently announced and have caused a good deal of dissatisfaction, traceable perhaps to two factors: (a) Assessment committees have taken different views of their responsibilities in different regions, and (b) in widely scattered rural areas members of the Assessment Committee may have no personal knowledge of the men they are grading and so cannot take into account that "experience which may of itself suffice to warrant acceptance as a specialist". This second reason bears particularly heavily on the general-practitioner specialist. A difficulty has also arisen over the special group known as senior hospital medical officers. Many of these men have been doing specialist work and are worthy of the position and emoluments of full specialists, but despite this they are still kept on as senior hospital medical officers and so suffer financially. The British Medical Association is doing all it can to safeguard the interests of these men and has gone so far as to refuse to advertise in the journal vacancies for senior hospital medical officers required to do specialist work. Put bluntly, this is regarded as a money-saving device on the part of the Ministry. Those engaged in the numerically smaller branches of medicine, such as tuberculosis, mental diseases and venereology, have suffered most in this connexion. Various suggestions have been made as to how to improve the system and particularly as to the question of appeals. Two most commonly heard are: (i) The appellant should have the right to state his appeal in person to the Board. (ii) At least half, if not more, of the Appeal Board should not have adjudicated on the original application. A point that has given universal satisfaction is that the grading is done by the profession itself. On this basis it should be possible to arrive at an equitable and satisfactory system, though criteria may vary somewhat from region to region.

## Obituary.

ARTHUR GRAHAM BUTLER.

We are indebted to Dr. Victor Hurley for the following appreciation of the late Colonel Arthur Graham Butler.

The death of Graham Butler was mourned by a large circle of friends, and particularly by those who served with the Australian Imperial Force in the first World War. Few medical officers were so universally respected and admired as he was, and he had the affection and complete trust of all, officers and men alike. He came of an old Queensland family, and after his preliminary schooling at Ipswich Grammar School he proceeded to Cambridge, England. He graduated first in arts in 1894, gaining first-class honours in his natural history tripos. He studied medicine at St. Mary's Hospital, London, at the time when Professor Sir Almroth Wright was there and Butler worked for a time in his laboratory. While at St. Mary's he distinguished himself in athletics and was an outstanding quarter-mile and half-mile runner. He also rowed in the St. John's College boat. He graduated in medicine at the University of Cambridge in 1899.



On his return to Queensland, Butler went into practice. He took the degree of Bachelor of Medicine of the University of Sydney, *ad eundem gradum*, in 1908. In Brisbane he became interested particularly in gynaecology and obstetrics and was honorary assistant surgeon at the Lady Carrington Hospital, Brisbane. He was honorary secretary of the Queensland Branch of the British Medical Association from 1912 to 1914 and president in 1920. On the outbreak of war in 1914 he immediately offered his services. He was appointed regimental medical officer to the Ninth (Queensland) Battalion in the First Australian Division. This battalion was one of the units of the famous Third Infantry Brigade which led the assault at the landing at Anzac on the morning of April 25, 1915. Butler as medical officer of his battalion was, I believe, the first medical officer ashore. In the confused fighting of those first few critical days many were the stories told of Butler's heroism and devotion to duty. He became a legendary figure with the troops and his deeds were spoken of long afterwards by the men who had served with him. There was the oft-repeated story that Butler, after using his clothing and equipment for bandages for the wounded, led a charge clothed only in his boots and identity disk. For his work at the landing and later in the Gallipoli campaign he was awarded the D.S.O.

Later in the war Butler filled various positions in the Medical Services, and in all of these, while giving service to the troops under his care, he invariably displayed a devotion



to duty and a complete disregard of his own personal safety and comfort. The men in the ranks would do anything for him because they appreciated fully his kindly and almost paternal interest in everything concerning their welfare. This was outstandingly displayed in the grim conditions of the 1916 winter in France and in 1917 at Passchendaele and other battles in which the Australian Imperial Force was engaged under appalling conditions and hardships. Towards the end of the war he was detached for the special duty of collecting and collating the information required to produce the history of the Medical Services in the war. He proceeded to obtain the information at first hand by visiting the units in the field and securing the stories from the officers and men who had taken part in the campaign on the various battle fronts. He moved about from unit to unit with all his belongings in an infantry pack and wearing an ordinary "issue" Digger's uniform. He was sufficiently well known in all Australian units to be recognized in this unconventional dress as a senior officer, but on many occasions he had difficulty in convincing the guards at strange units of his identity. On one occasion the military police stopped and questioned him because they suspected that he was not entitled to the badges of rank which he was wearing. An office was later established at Australian Headquarters in London where records were sorted and stored and Butler had with him Mr. Withers and Mr. Treloar, who later were associated with the Australian War Memorial at Canberra.

After his return to Australia Butler began the monumental task of writing the history. This was expected to take only a few years, but it was to absorb the greater part of his activities for the next twenty years, though for part of the time he served as medical officer at the Royal Military College, Duntroon. Butler wrote and rewrote his history because he was determined that it should be completely factual and he personally supervised the accuracy of the statements. The work crippled him financially as the undertaking he had given at the commencement of the work proved to be entirely inadequate for the amount of work which was required. He never complained, but carried on. The Federal Council of the British Medical Association in

Australia recognized the value of his labours and awarded him its gold medal in 1944.

During the last years of his life Butler fell on ill health and his eyesight failed owing to double cataract, so that he could read only with the aid of a large hand glass. He continued his work in spite of handicaps and never failed to take an interest in matters affecting ex-service men. He was a brave and lovable personality whose transparent sincerity and love of his fellow men endeared him to everyone. He was the soul of honour and incapable of any uncharitable thought or act. His name will be revered by all who knew him and as long as the deeds of the First Australian Imperial Force are remembered.

Dr. A. S. Walker writes: Graham Butler was unique as a man and as an idealist. Tireless in the fulfilment of a task, scrupulous in detail, open, honest and sincere, he brought these qualities to his medical history of the 1914-1918 war. Unfortunately, overworked and long neglected in his onerous task, he was not able to bring his history to fruition earlier, but in the later volumes may be seen the expansion of his powers as an historian. With detailed appreciation of the military circumstances of every phase of medical activity in the field, he followed the story in training camps, on Gallipoli, on the Western Front, and in base areas, but as the work grew a stronger light was cast on the preventive side of military medicine. Where breakdowns occurred, Butler did not hesitate to describe them and to trace their cause. His story is pervaded by at least three *leit-motifs*—the organized work of medical men in war, especially in the field, the importance of prevention of illness, and the role of medical men in the mitigation of sufferings of men in the tragedy of war. In his first volume he spoke of "the element of antagonism inherent in two fundamental responsibilities of the medical service—humane alleviation on the one hand and the promotion of victory on the other". He never lost sight of this. Most readers would agree that his last volume was the best, where he left the day-by-day account of the routines and emergencies of an army in action and dealt broadly with the problems of a medical service. The historian's own evolution showed that in

DISEASES NOTIFIABLE IN EACH STATE AND TERRITORY OF AUSTRALIA AND NOTIFICATIONS FOR THE WEEK ENDED AUGUST 20, 1949.<sup>1</sup>

Disease.	New South Wales.	Victoria <sup>4</sup> .	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory. <sup>3</sup>	Australian Capital Territory.	Australia. <sup>2</sup>
Ankylostomiasis .. ..	•	1	3	•	•	•	•	•	4
Anthrax .. ..	•	•	•	•	•	•	•	•	•
Beriberi .. ..	•	•	•	•	•	•	•	•	•
Bilharziasis .. ..	•	•	•	•	•	•	•	•	•
Cerebro-spinal Meningitis .. ..	•	1(1)	1(1)	1(1)	•	•	•	•	3
Cholera .. ..	•	•	•	•	•	•	•	•	•
Coastal Fever(a) .. ..	•	•	•	•	•	•	•	•	1
Dengue .. ..	•	•	•	•	•	•	•	•	•
Diarrhoea (Infantile) .. ..	•	•	12(11)	•	•	•	•	•	12
Diphtheria .. ..	16(5)	4(2)	5	•	•	•	•	•	25
Dysentery(b) .. ..	•	1(1)	•	•	•	•	•	1	2
Encephalitis Lethargica .. ..	•	•	•	•	•	•	•	•	•
Erysipelas .. ..	•	•	•	1(1)	•	•	•	•	1
Filariasis .. ..	•	•	•	•	•	•	•	•	•
Helminthiasis .. ..	•	•	•	•	•	•	•	•	•
Hydatid .. ..	•	•	•	•	•	•	•	•	•
Influenza .. ..	•	•	•	•	•	•	•	•	•
Leprosy .. ..	•	•	•	•	•	•	•	•	•
Malaria(c) .. ..	•	(e)	(e)	(e)	(e)	(e)	(e)	(e)	1
Measles .. ..	•	•	•	79(24)	•	•	•	•	79
Plague .. ..	•	•	•	•	•	•	•	•	•
Polio-myelitis .. ..	1(1)	30(22)	•	10(8)	•	•	•	•	41
Pellagra .. ..	•	•	•	•	•	•	•	•	•
Puerperal Fever .. ..	2(2)	•	1	•	•	•	•	•	3
Rubella .. ..	•	•	•	•	•	•	•	•	•
Scarlet Fever .. ..	44(26)	43(11)	4(3)	10(8)	2(1)	5(5)	•	1	111
Smallpox .. ..	•	•	•	•	4(4)	•	•	•	•
Tetanus .. ..	•	•	•	•	•	•	•	•	•
Trachoma .. ..	•	•	•	•	•	•	•	•	•
Tuberculosis(d) .. ..	24(20)	15(10)	11(3)	5(3)	12(7)	6(3)	•	2	75
Typhoid Fever(e) .. ..	•	•	2(1)	•	•	•	•	•	3
Typhus (Endemic)(f) .. ..	•	•	3	•	•	•	•	•	3
Undulant Fever .. ..	•	•	•	•	•	•	•	•	•
Well's Disease(g) .. ..	•	•	•	•	•	•	•	•	•
Whooping Cough .. ..	•	•	•	55(2)	•	•	•	•	55
Yellow Fever .. ..	•	•	•	•	•	•	•	•	•

<sup>1</sup> The form of this table is taken from the *Official Year Book of the Commonwealth of Australia*, Number 36, 1944-1945. Figures in parentheses are those for the metropolitan area.

<sup>2</sup> Figures not available.

<sup>3</sup> Figures incomplete owing to absence of returns from the Northern Territory.

<sup>4</sup> Figures for Victoria for the week ended August 13, 1949, which arrived too late for inclusion in the previous issue, included the following: poliomyelitis 27(20) with three deaths; tuberculosis 15(7) with 10 deaths; scarlet fever 63(12).

<sup>5</sup> Not notifiable.

(a) Includes "Mossman" and "Sarina" fevers. (b) Includes amoebic and bacillary. (c) Statistics inexact with varying practice with regard to relapses in service cases infected overseas. (d) Includes all forms except in New South Wales and Northern Territory, where only pulmonary tuberculosis is notifiable. (e) Includes enteric fever, paratyphoid fevers and other *Salmonella* infections. (f) Cases reported include scrub, murine and tick typhus. (g) Includes leptospirosis, Well's and para-Well's disease.

essence a medical history is one of problems. There is still a mass of unpublished material of his, and he lamented that it was not possible to prepare and publish a volume on humanitarianism in war. To the last he was equally eager to acquire knowledge and to give help to others. He read some drafts of my own work, making copious notes on every page, and I could never forget his enthusiastic face pressed close to the paper, striving to find a passage with his pathetically failing sight. Physical obstacles meant little to this man of courage, and if his eyesight was dim his real vision was always clear, not only of the intellect, but of the spirit.

### Correspondence.

#### B.C.G. VACCINATION AGAINST TUBERCULOSIS.

SIR: I am sorry that Dr. Poynton (THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, 1949, page 334) felt that he had to enter the lists on behalf of Miss Atkinson and her associates by criticizing Dr. North's article on B.C.G. vaccination, which was published in your issue of July 30, 1949, as it seemed to me it was unnecessary. As a comparative newcomer to this country, perhaps Dr. Poynton does not realize that Miss Atkinson's work is widely known and respected and that Dr. North's modesty and fairness are beyond question.

I think it is transparently clear that Dr. North's object in writing the article was not to make claims for anyone, but (i) to inform the profession of the evidence for vaccination, and (ii) to indicate the conditions under which the vaccine should be used.

In my opinion Dr. North's article is well balanced, clear and informative. No claim for pioneering is made. I do not believe for a moment that Dr. North was guilty of discourtesy, as suggested by Dr. Poynton, in omitting to quote the work of Miss Atkinson and her associates, the first of its kind in Australia. Dr. North was mainly concerned in marshalling the evidence for vaccination and no doubt thought, as I do, that this promising Australian work has not yet proceeded far enough to afford evidence of actual protection against tuberculosis, whereas European and American work does provide this evidence.

A freeze-dried B.C.G. vaccine is obviously desirable to prolong the viability of the organisms in the vaccine. However, I think that everyone would agree that more work will have to be done before the use of a freeze-dried vaccine can be recommended with complete confidence.

Yours, etc.,  
HUGH WARD.

The University of Sydney,  
Sydney,  
September 2, 1949.

### Births, Marriages and Deaths.

[The charge for inserting advertisements of births, marriages and deaths is 5s., which sum should be forwarded in money order or stamps, with the notice, not later than the first post on Monday, in order to secure insertion in the current issue.]

#### DEATH.

ARCHDALL.—On August 31, 1949, at Melbourne, Martha Caroline Christine, widow of Mervyn Archdall, Clerk in Holy Orders, and mother of Mervyn, Henry and Rosa, in her ninety-eighth year.

### Medical Appointments.

Dr. F. C. Archibald has been appointed surgical registrar, Royal Adelaide Hospital, Adelaide.

Dr. Robert Hecker has been appointed pathological registrar and resident clinical pathologist, Royal Adelaide Hospital, Adelaide.

Dr. R. F. R. Scragg has been appointed resuscitation registrar at the Royal Adelaide Hospital, Adelaide.

Dr. W. G. Duguid has been appointed out-patient registrar at the Royal Adelaide Hospital, Adelaide.

### Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Pearce, Raymond William, M.B., B.S., 1948 (Univ. Sydney), 23 Darling Point Road, Darling Point.

Freedman, Albert, M.B., B.S., 1947 (Univ. Sydney), Saint Vincent's Hospital, Darlinghurst.

### Diary for the Month.

SEPT. 13.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

SEPT. 15.—Victorian Branch, B.M.A.: Organization Subcommittee.

SEPT. 19.—Victorian Branch, B.M.A.: Finance, House and Library Subcommittee.

### Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

**New South Wales Branch** (Honorary Secretary, 135 Macquarie Street, Sydney): Ashfield and District United Friendly Societies' Dispensary; Balmmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester United Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

**Victorian Branch** (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

**Queensland Branch** (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

**South Australian Branch** (Honorary Secretary, 178 North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

**Western Australian Branch** (Honorary Secretary, 205 Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

### Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

**SUBSCRIPTION RATES.**—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £3 per annum within Australia and the British Commonwealth of Nations, and £4 10s. per annum within America and foreign countries, payable in advance.